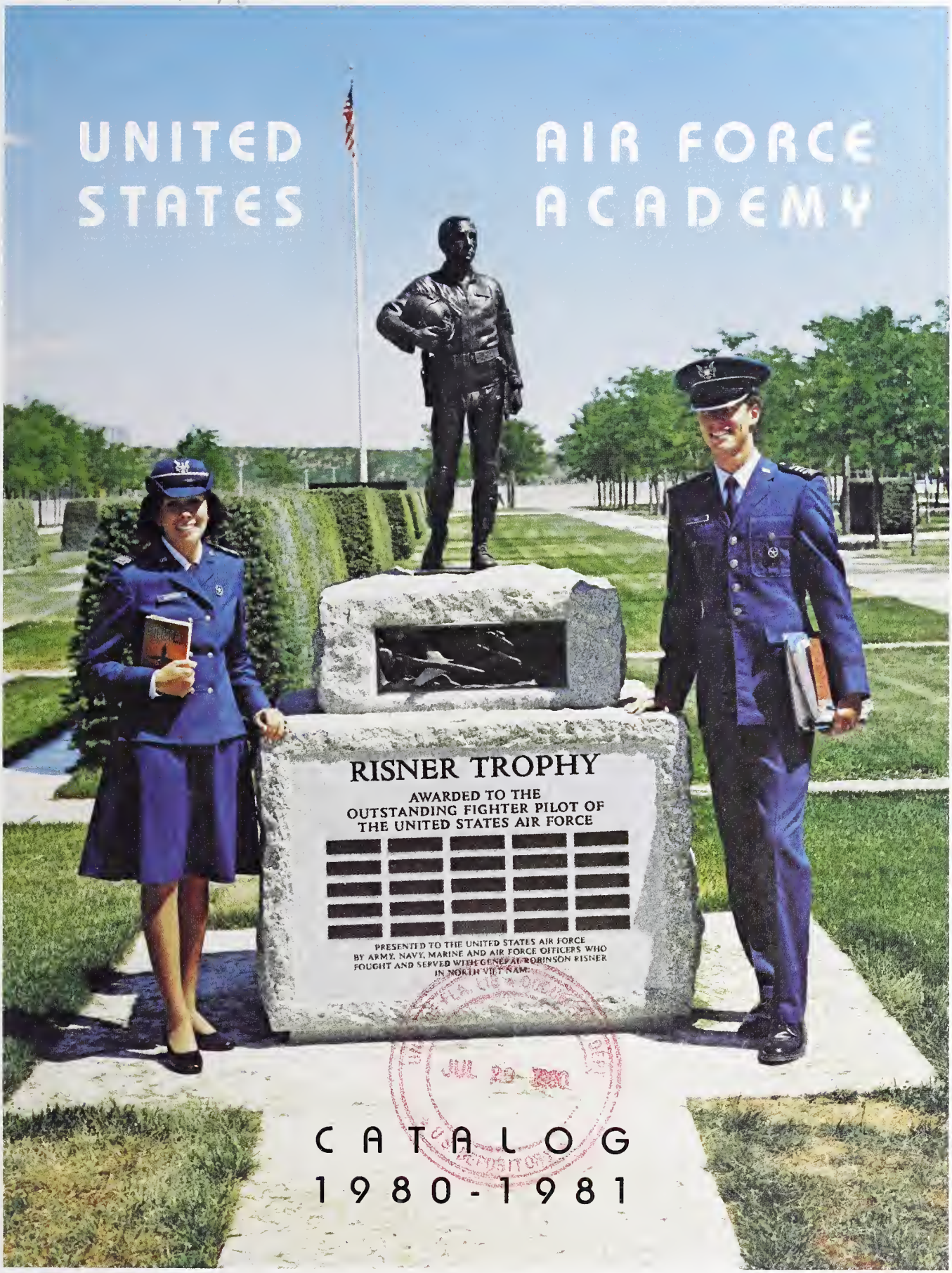
# UNITED STATES AIR FORCE ACADEMY






# CATALOG 1980-1981

# UNITED STATES AIR FORCE ACADEMY

## annual catalog 1980-81 number 25


*General Tallman, left, congratulates Brig General Robison Risner, a fighter pilot and a Vietnam prisoner of war, during dedication of the Risner Trophy.*

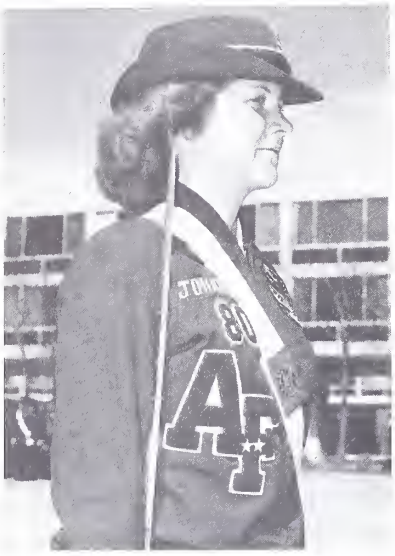


**COVER PHOTOS**

**Front Cover:** Cadets Debbi LaFrambois and Henri Bigo beside the Risner Trophy, the newest of landmarks at the Academy.

**Back Cover:** Cadets Steve Newbold and Debbie Dubbe with landmarks which have become a part of the Academy's tradition.

*Photos by Bill Madsen, Academy Public Affairs Office*



## *CLASS OF 1980*

These graduates of the Class of 1980 are just a few of the outstanding men and women who will serve our country after completing four years of education and training at the Air Force Academy. The motto of this class is "Strive to Excel."

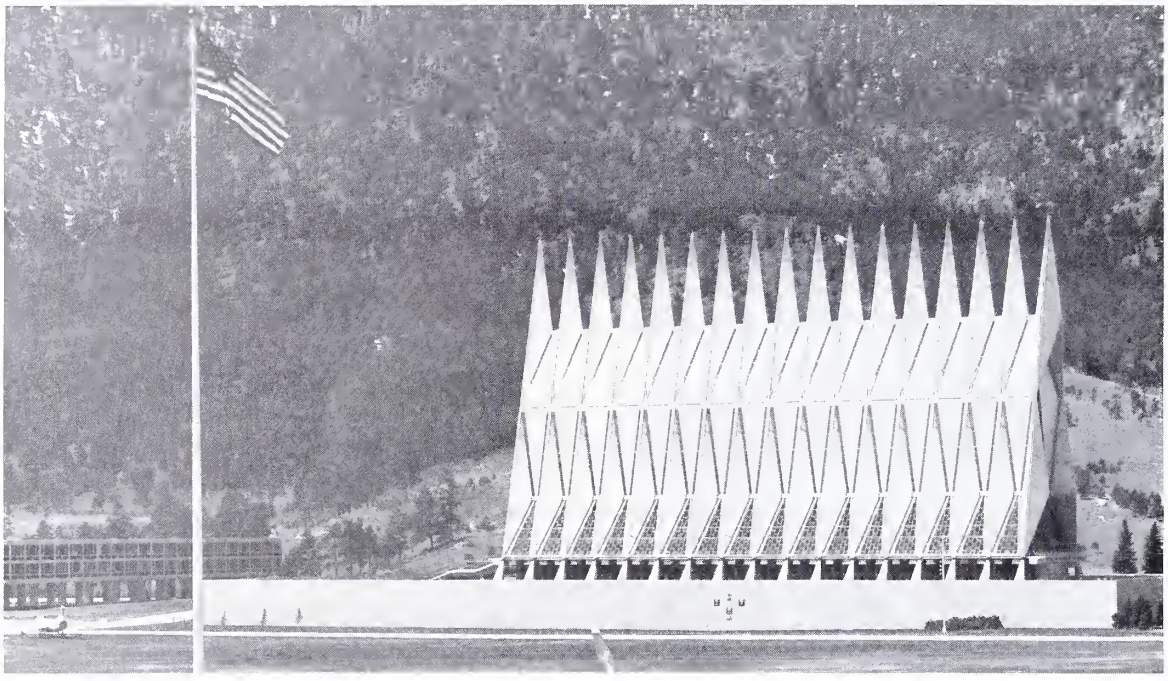

# To Interested Young Men and Women

Developing future officers with the knowledge, character, and motivation to become leaders in the United States Air Force is our objective at the Academy. Each year young men and women from every part of the nation are selected to enter the Academy as cadets. The Academy faculty and staff are devoted to the development of each cadet in the academic, leadership, airmanship, and athletic phases of our curriculum. After four years of preparation, cadets graduate with bachelor of science degrees and commissions in the Regular Air Force. Each graduate receives a job assignment in the Air Force, either immediately following graduation or after completing a specialized training program.

I suggest that you review the material in this catalog very thoroughly. Be sure to understand our requirements and your commitment to the Academy and the Air Force if you become a cadet. You will be expected to put forth your best effort to succeed in all phases of our education and training. The mental and physical tasks involved in this achievement are demanding but rewarding. You will reach heights beyond abilities known before, finding you can perform greater than your expectations. You will enjoy our outstanding educational facilities and will participate in many experiences beyond the normal education.

If you have the potential and the desire to enter the Academy, I hope you will take the proper steps to apply just as soon as you are eligible. My best wishes for your success.

K. L. TALLMAN
Lieutenant General, USAF
*Superintendent*



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An abbreviated Academy Bulletin has been extracted from the Academy Catalog and printed as a separate publication. The bulletin should be used by high school students, counselors, and other interested persons who are seeking general information about the Air Force Academy. The catalog should be used by individuals who are seeking detailed information about the Academy curriculum and faculty.

Air Force Admissions Liaison Officers (LOs) will receive copies of the catalog and the bulletin. They should provide a copy of the bulletin to students in their area whose eligibility to compete for a cadet appointment has been determined through their precandidate questionnaire. LOs should provide copies of the catalog to high school counseling offices.

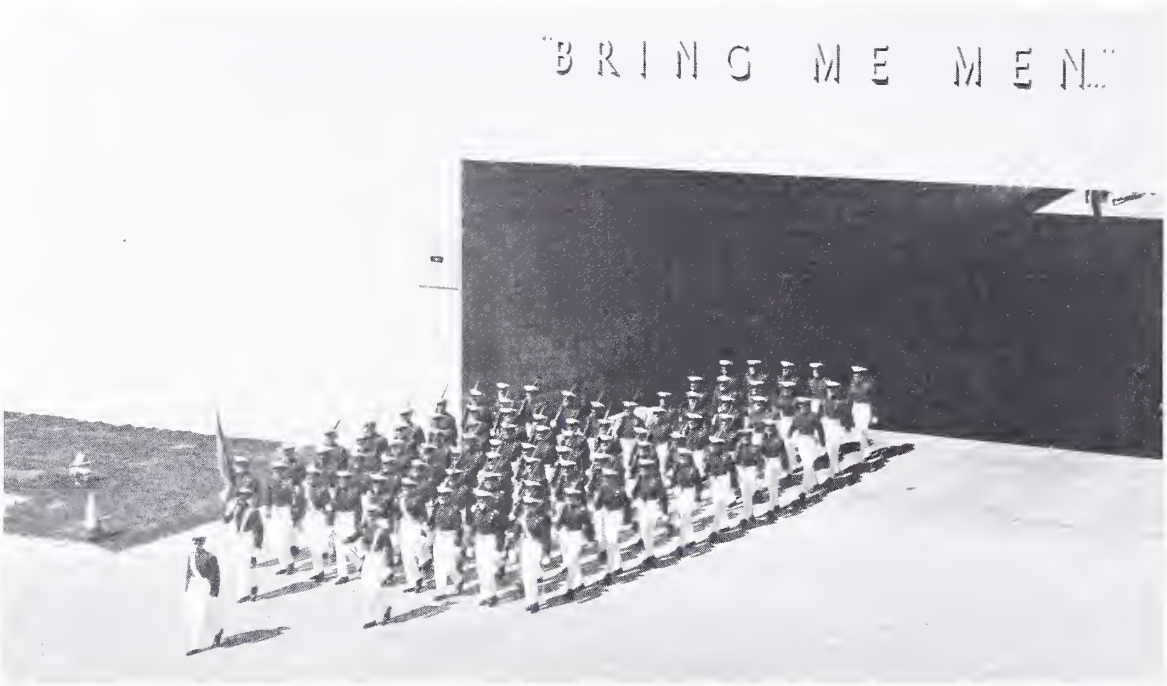
Microfiche copies of the catalog will be mailed to high school counseling offices and to libraries (public, government, college and university).

To obtain Academy literature appropriate to your needs, write to the Academy and state the information desired. If you are a student, include your age and grade in school.

Send your request to: Cadet Admissions Office
USAF Academy, Colorado 80840

# CALENDAR 1980-1981

| | | | | |
|---|---|---|---|---|
| 2 | Jun | 80 | Monday | Summer Term Begins |
| 23 | Jun | 80 | Monday | Class of 1984 Enters |
| 4 | Jul | 80 | Friday | Holiday, Fourth of July |
| 3 | Aug | 80 | Sunday | Summer Term Ends |
| 4-7 | Aug | 80 | Monday-Thursday | Transition Period |
| 8 | Aug | 80 | Friday | Fall Semester Begins |
| 1 | Sep | 80 | Monday | Holiday, Labor Day |
| 11 | Nov | 80 | Tuesday | Holiday, Veterans Day |
| 27 | Nov | 80 | Thursday | Holiday, Thanksgiving Day |
| 10 | Dec | 80 | Wednesday | Fall Semester Classes End |
| 12-18 | Dec | 80 | Friday-Thursday | Fall Semester Final Exams |
| 19 | Dec | 80 | Friday | Christmas Leave Begins |
| 4 | Jan | 81 | Sunday | Christmas Leave Ends |
| 5 | Jan | 81 | Monday | Spring Semester Begins |
| 16 | Feb | 81 | Monday | Holiday, Washington's Birthday |
| 20 | Mar | 81 | Friday | Class of 1984 Recognition |
| 21-29 | Mar | 81 | Saturday-Sunday | Spring Break Leave Period |
| 9 | May | 81 | Saturday | Spring Semester Classes End |
| 11-16 | May | 81 | Monday-Saturday | Spring Semester Final Exams |
| 25 | May | 81 | Monday | Holiday, Memorial Day |
| 27 | May | 81 | Wednesday | Graduation Day |




# HISTORY

OUR century has seen the birth and tremendous growth of American military aerospace power. The aviation pioneers of World War I prepared the way for the decisive role played in World War II by both tactical and strategic airpower. After the second war, our nation's leaders realized the growing importance of airpower to free-world defense, and in 1947 Congress established the United States Air Force as an independent branch of service.

The Air Force saw the need for an academy specifically designed to educate a nucleus of career officers for the new service. On April 1, 1954, Congress authorized establishment of the Air Force Academy and President Dwight D. Eisenhower signed the legislation. The Secretary of the Air Force appointed a site selection committee, composed of prominent civilian and military leaders, to screen sites throughout the country to find an appropriate spot for the new academy.

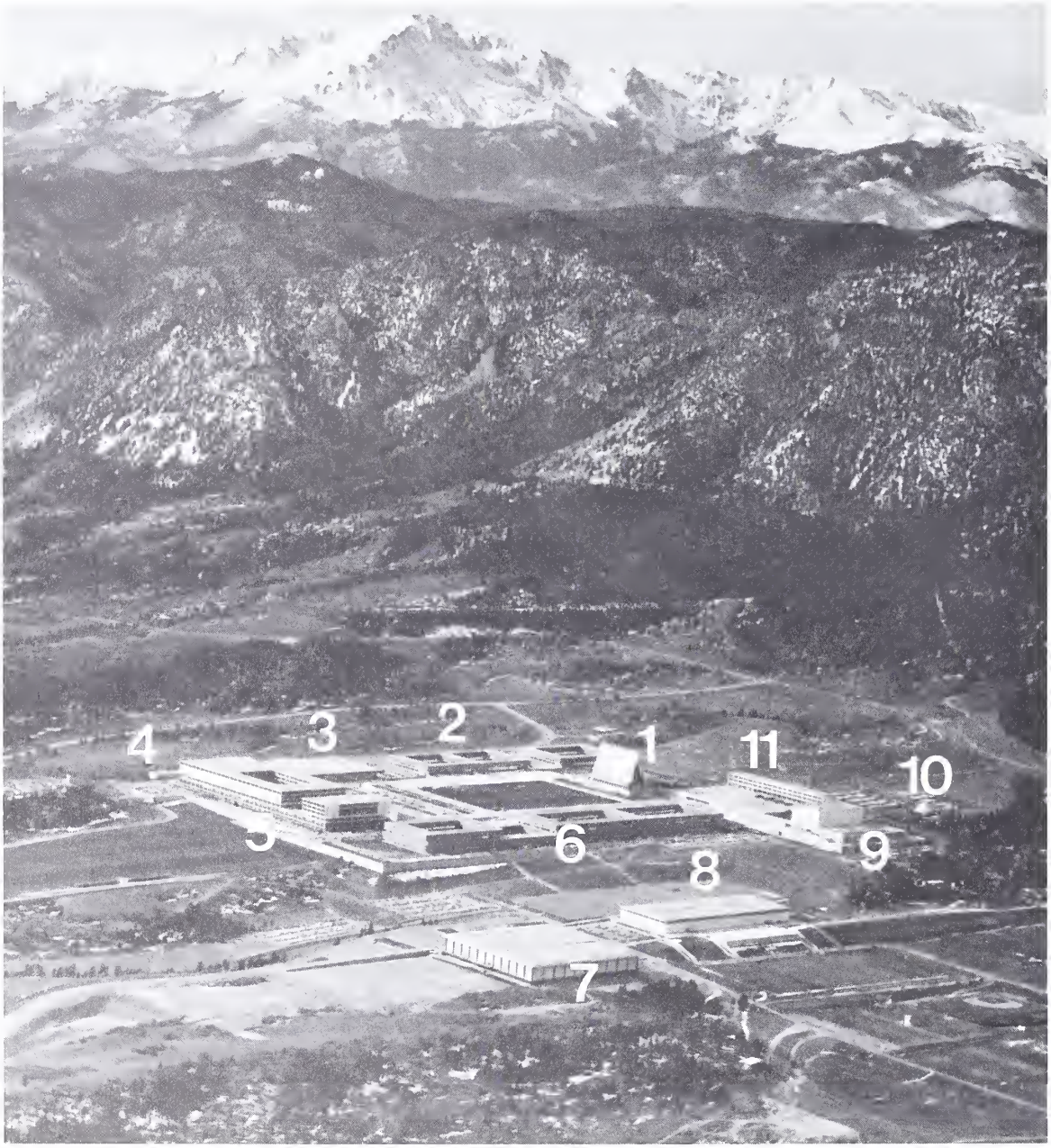
An Academy staff member, who was asked by the selection committee to survey some areas in Colorado, spotted a large expanse of land just north of Colorado Springs that impressed him tremendously. He expressed his enthusiasm to the selection committee members who arranged to inspect the location. They explored the land on horseback and then flew over the site with Charles A. Lindbergh, a member of the committee, at the controls. They too were impressed with the site, located along the Rampart Range of the Rocky Mountains, with Pikes Peak towering in the background. They liked the scenic land formations divided into mesas and valleys with picturesque pine trees and rugged rocks. After screening numerous locations and visiting proposed sites in many states, the committee agreed on this unique site in Colorado. Pending construction of the Academy at the permanent site, a temporary location at Lowry Air Force Base in Denver was prepared to accept the first class. On July 11, 1955, the first class of 306 cadets was sworn in and the Academy was dedicated.

*The Class of 1980, the first class to include women cadets, graduated with 789 men and 98 women.*

Lt. General Hubert R. Harmon was appointed by the President as the first Superintendent of the Academy. Under General Harmon's direction, the Academy staff designed a balanced program of academics, leadership, and athletics. With the goal of producing a well-rounded officer, the core curriculum combined courses in the basic and advanced sciences with those in the humanities and social sciences. Cadets were free to choose electives in their special fields of interest, giving the course of instruction added diversity.

While a cadet way of life, a tradition, and a curriculum were being formed at Lowry, work got underway in the fall of 1955 on one of the greatest construction projects in the nation's history. The cadet area was located atop a mesa, over 7,000 feet in altitude, appearing very high in the sky and remarkably appropriate as the school to prepare future leaders for the conquest of space. On August 29, 1958, cadets began to move into their new quarters, and on June 3, 1959, the Academy commissioned its first officers.

Since the first class graduated, the Cadet Wing has grown to over 4,000 members and they have now developed their own heritage. One of the landmarks of the Academy is the Eagle Statue in the cadet area with its inscription "Man's Flight Through Life is Sustained by the Power of his Knowledge." Another is the "Bring Me Men" legend over the archway which the cadets march through to reach the parade ground. Although the legend is expected to remain, women cadets began marching with the men through this arch in 1976. The admission of women was authorized by legislation passed by the Congress and signed by President Gerald R. Ford on October 7, 1975. The first group of 157 young women entered on June 28, 1976 and 98 of them graduated on 28 May 1980. Women will comprise approximately twelve percent of each entering class, which is equivalent to the percentage of women in the Air Force.




1. CADET CHAPEL
2. SIJAN HALL (Cadet Dormitory)
3. MITCHELL HALL (Cadet Dining Hall)
4. AERONAUTICS LABORATORY
5. FAIRCHILD HALL (Academic Building)
6. VANDENBERG HALL (Cadet Dormitory)
7. FIELD HOUSE
8. GYMNASIUM
9. ARNOLD HALL (Cadet Social Center)
10. PLANETARIUM
11. HARMON HALL (Administration Building)

# FACILITIES

THE Academy site encompasses 18,000 acres of former ranch land, divided into five mesas with valleys in between. This expanse of land allowed sufficient space for the flying training programs and for further expansion of the facilities to accommodate additional students.

Dominating the western side of the reservation are the majestic mountains with renowned Pikes Peak in the distance. The site adjoins the sweeping plains to the east. On all sides are spectacular scenes of nature to frame the modern campus. The cadet area, which is the main complex of the Academy, is constructed on the mesa or ridge at the north end of the site. The buildings are designed in contemporary architectural style featuring glass, aluminum, steel and white marble. Some buildings have been named for famous Air Force leaders.

VANDENBERG HALL, a cadet dormitory, has 1,320 rooms, squadron areas, hobby shops, counseling offices and a cadet store. It was named in honor of General Hoyt S. Vandenberg, former Chief of Staff of the Air Force.

SIJAN HALL, an 830-room dorm, was named for the late Captain Lance P. Sijan, Class of 1965, the Academy's first Medal of Honor winner.

FAIRCHILD HALL, the cadet academic building, contains academic facilities as well as a cadet dispensary and the Academy Library. It was named for General Muir S. Fairchild, pioneer of Air Force education. Near the academic building are an Aeronautics Lab, an Electronics Lab, and an Observatory.

MITCHELL HALL, the cadet dining hall, accommodates all cadets at one sitting for meals. It was named for General Billy Mitchell, pioneer of military aviation.

HARMON HALL, the administration building, houses the offices of the Superintendent and his staff. It was named for Lt. General Hubert R. Harmon, first Superintendent of the Academy.

ARNOLD HALL, the cadet social center, includes a ballroom, auditorium, bowling alley, recreation rooms, lounges and snack bars. It was named in honor of General Henry H. "Hap" Arnold, World War II Air Force leader.

THE PLANETARIUM, containing a modern projector which displays the heavens, is used for cadet instruction and public showings.

THE CADET GYMNASIUM AND FIELD HOUSE contain facilities for intramural and intercollegiate sports. The gymnasium has two swimming pools (one olympic size) and many athletic courts and areas. The field house is a unique sports arena which has a multi-purpose area utilized for indoor track and practice of football and other sports; a 6,600-seat basketball court; and 2,600-seat ice hockey arena.

THE CADET CHAPEL, focal point of the cadet area, is striking in its design with 17 towering spires which admit light to the Protestant chapel through colorful stained glass. Catholic and Jewish chapels and an All-Faith worship room are located on the lower floor level.

Located in areas south of the complex are: the Academy Hospital which serves the cadets and other military personnel and dependents; the Officers Club and bachelor and visiting officers quarters; Douglas Valley and Pine Valley family housing areas with public schools; the Community Center shopping area for military personnel and families; the Academy Preparatory School; and a Supply and Services area to support the Academy.

A 3,500-foot airstrip, located on the southeast perimeter of the Academy, serves the lightplane, sailplane, and parachuting activities of the Cadet Aviation Program. The airstrip is also used for flying activities by the Academy Aero Club.

Falcon Stadium and Eisenhower Golf Course, located east of the cadet area, were financed with private funds donated through the Air Force Academy Foundation. The Farish Memorial recreation area in the nearby mountains of the Rampart Range was donated to the Academy for cadets and Academy personnel.

# MISSION

*The Academy's Mission is to provide instruction and experience to all cadets so that they graduate with the knowledge and character essential to leadership and the motivation to become career officers in the United States Air Force.*

A CADET class enters the Air Force Academy in June each year. It is important for all appointed cadets to understand fully the serious purpose of the Academy and what is required during the four years here. Studying these requirements in advance will help you to be prepared and to know what it takes to succeed. With only a few exceptions, women and men cadets will undergo the same training and instruction.

If you become a cadet, you will be sworn into the Air Force soon after you arrive at the Academy. Your ability to live under military discipline will be tested during the next six weeks when you undergo a rigorous indoctrination to military life. This program called BCT (Basic Cadet Training) is led by upperclass cadets under supervision of Air Force officers. The training is highly demanding, mentally and physically. It will continually challenge you and test your endurance, but you can prove equal to the expectations. The cadets who have the least problems are those who are willing to adapt to their new life and put forth their best efforts to succeed. If you successfully complete BCT, you will become a member of the Air Force Cadet Wing and begin the fall semester as a fourth class cadet.

Completing BCT is an accomplishment for which you can be justly proud, yet the requirements for you as an Academy cadet are only beginning. Now you must concentrate your full attention on the education and training which will continue for four years. You must abide by military rules that restrict your personal activities, and you must meet required standards of performance in all phases of the curriculum. Three major programs are included in the curriculum, as follows:

**The leadership program** is a distinctive aspect of the Academy which serves as a foundation to build a professional career as an Air Force officer. You will gain insight into the operation of the Air Force and the military responsibilities of an officer. You will start to develop leadership skills in your role as a follower during your first two years at the Academy. These skills will then be refined as you experience leadership roles during your last two years. You will have opportunities to participate in various optional summer programs which provide a foundation for the Air Force flying mission.

**The academic program** enables you to acquire the intellectual background for Air Force leadership. The curriculum includes a general education in the basic and engineering sciences, the social sciences, and the humanities, as well as specialization in a major of your choice. Courses in aeronautics, astronautics, and other sciences will apply to many Air Force requirements in this age of aerospace technology. Elective courses are offered if you wish to increase your knowledge of various subjects or to prepare for the possibility of graduate education in the future.

**The athletic program** involves all cadets in the development of physical fitness for leadership. The four-year coeducational program includes classroom instruction and athletic participation. You will learn a variety of skills with emphasis on competition, aquatics, body development, and recreational sports. You will acquire techniques of participating and coaching in individual and team sports. You will compete in many intramural athletic contests, and if you excel in a sport, you may play on an intercollegiate team representing the Academy.

### Graduation and Service

The keynote of the entire curriculum is challenge, both mental and physical. The reason for these challenges is to develop superior officers for the Air Force— officers committed to duty, honor, and service to country. By completing the four-year program, you will graduate with a Bachelor of Science degree and a commission in the Regular Air Force.

Following graduation a majority of the new officers enter Air Force pilot or navigator training. The Academy curriculum, which is structured to provide a background for flying training, includes orientation courses for future pilots and navigators. If you are qualified and request flying training, you will be assigned to an Air Training Command base for approximately a year to earn your wings and flying rating. Academy graduates who do not attend flying training will be assigned to mission-support career areas within the Air Force.

Pilots must serve on active duty for six years and navigators for five years following completion of flying training. Nonflying graduates must serve on active duty for five years following graduation from the Academy. After the experience of serving in the Air Force, a majority of the graduates have elected to remain for a professional career.

# THE CURRICULUM

## Semester Schedule

The Air Force Academy conducts the program of education and training for cadets throughout the year. The yearly calendar is divided into three sessions: a summer term, a fall semester, and spring semester.

The summer term is approximately nine weeks long. Summer training programs begin immediately following graduation. The new cadet class enters the Academy on a Monday, which usually occurs the last week in June. The basic cadet summer training schedule consists of a few days of processing followed by a six-week training period.

The three upper classes receive leadership and military instruction at the Academy. Members of these classes may also be assigned to other military installations and designated locations for specializing training. All cadets except the new class receive three weeks of leave during the summer.

Fall and spring semesters contain approximately 17 weeks of instruction or 42 lessons per semester. The fall semester begins about mid-August and ends during the week before Christmas. The spring semester begins during the first week in January following Christmas leave and ends the last week in May. Each semester includes a final examination period of five or six days.

The academic week in the fall and spring semesters consists of five days, Monday through Friday, with seven 50-minute class periods per day. Unscheduled class periods are devoted to study in the library or cadet rooms. Most Wednesday afternoons and some Saturday mornings are used for military training activities and events of the Cadet Wing.

## Grading

The quality of your performance in a graded course is reported by means of letter grades. These grades denote character of work and are assigned grade points.

| *Grade* | *Character* | *Grade Points Per Semester Hour* |
|---|---|---|
| A | Excellent | 4 |
| B | Good | 3 |
| C | Satisfactory | 2 |
| D | Passing | 1 |
| F | Failing | 0 |

Several courses, particularly Military Training, Airmanship and Physical Education, are graded on a P (Pass) /F (Fail) basis.

Additional letter grades of W (Withdrawn), WP or WF (Withdrawn while Passing or Failing, awarded after midsemester), N (No grade, continuing without penalty), and I (Incomplete) may be awarded.

Cadets are graded on quizzes, examinations, homework, or class recitations. For each 50-minute class period, you are normally expected to devote 75 minutes to outside preparation. You may be called upon to participate and recite in class. A computerized grading system enables instructors to keep a constant evaluation of each cadet's performance. You are informed of your grades by a progress report at midsemester and a final report at the end of the semester.

## Cadet Achievement

Cadets are recognized for achievement in academic courses and military performance as follows:

1. Cadets who excel in academic courses are placed on the Dean's List at the end of each fall and spring semester. Included are cadets whose Grade-Point Average (GPA) is 3.0 or greater.
2. Cadets who excel in military performance are placed on the Commandant's List at the end of each fall and spring semester. Included are cadets of each class who have achieved a Military Performance Average (MPA) of 3.0 or greater.
3. Cadets who are on both the Dean's and Commandant's List are carried on the Superintendent's List denoting excellence in both academic and military performance.

If your name appears on either of these lists, you are recognized for this distinction by an appropriate insignia on your uniform.

A small silver star denotes the Dean's List, a silver wreath signifies the Commandant's List, and a silver star enclosed in a silver wreath indicates the Superintendent's List. If you achieve one or more of these distinctions, you may be awarded additional privileges on weekends.

## Deficiency and Disenrollment

A cadet is deficient in studies at mid-semester report or the end of semester/term when one of the following conditions exists: a grade of F or I in one or more courses (graded or pass/fail), a cumulative or semester GPA of less than 2.0, or a major GPA less than 2.0 in the first class year.

Cadets deficient in studies will be reviewed by a class committee at each mid-semester progress report and the end of each semester/term. The class committee will take final action on all cadets whose sole deficiency is one or more I grades obtained through no fault of their own, such as physical injury or sickness. Unless the class committee specifically states to the contrary, cadets deficient in studies will be placed on academic probation.

At the end of each semester or term the class committee will recommend to the Academy Board that a cadet who is deficient in studies be disenrolled for academic deficiency. Exceptions are made if the committee determines that both a cadet's overall performance and the probability of successfully completing the academic program will justify retention. The Academy Board will consider the recommendation of the class committee and make final decisions.

Cadets retained by the Academy Board may be directed to accomplish one or more of the following: repeat or take a specific course during a subsequent semester, underload one course, change academic majors, attend a summer term in place of leave, be turned back to the next succeeding class, or take any other action deemed appropriate.

A cadet will be considered deficient in military performance if his/her MPA is below 2.0 at the end of the semester. A Military Review Committee evaluates deficient cadets and places them on aptitude probation or initiates other corrective action. A cadet whose conduct or aptitude for commissioned service is seriously deficient may be disenrolled through the action of a Commandant's Board, if approved by the Academy Board.

A cadet will be considered deficient in Physical Education if he/she fails one or more items on the Physical Fitness Test (PFT) and has a total score below 226, or whose 1.5 mile aerobics run time is slower than 11:45. In addition, cadets who receive a failing grade in PE 120, 220, 320, or 420 will also be considered deficient.

Deficient cadets will be reviewed by the Athletic Review Committee one week following the final PFT make-up test in the fall and spring semesters and one week before spring semester finals. The committee will make recommendations to the Academy Board through the Director of Athletics. Committee recommendations may include: a remedial conditioning program, athletic probation, attendance at a summer term physical education program in place of leave, turn back to the next succeeding class, or disenrollment for physical aptitude deficiency.

## Graduation Requirements

All cadets will be required to meet the following graduation requirements:

- Demonstrate an aptitude for commissioned service and leadership by meeting a minimum standard overall MPA of 2.0.
- Be satisfactory in conduct.
- Be proficient in physical education and military training.
- Complete the requirements for the core curriculum and for an academic major, passing all courses (or equivalents) for the core and for the major.
- Meet a minimum standard of a cumulative overall GPA of 2.0 (C) and a cumulative GPA of 2.0 in your major.

# SUMMARY OF THE CURRICULUM

For the Class of 1984

| COURSE NUMBER | COURSE TITLE | SEMESTER HOURS |
|---|---|---|
| | **Fourth Class (Freshman)** | |
| *Summer* | | |
| Mil Tng 100 | Basic Cadet Training | 5 |
| Phy Ed 100 | Basic Physical Training | 2 |
| | | 7 |
| *Fall and Spring* | | |
| Beh Sci 110 | General Psychology | 3 |
| Bio Sci 110 | Aerospace Physiology | 1½ |
| Chem 101-102 | General Chemistry | 6 |
| Comp Sci 100 | Basic Programming | 3 |
| English 111 | English Composition | 3 |
| For Lang 131-132 | Basic Foreign Language | 4½ |
| History 101 | Europe and the World | 3 |
| Math 131-132-133 | Calculus | 9 |
| Armnship 101 | Sailplane Introduction | 0 |
| PMS 110 | Introduction to Military Science | 2 |
| AV 100 | Introduction to Aviation and Space Science | 1 |
| Phy Ed 105-106 | Competitive Athletics/Fitness Test | 2 |
| Phy Ed 120 | Physical Education | 1 |
| | | 39 |
| | **Third Class (Sophomore)** | |
| *Summer* | | |
| Mil Tng 200 | Summer Military Options | 2 |
| Mil Tng 210 | Survival Training | 2 |
| | | 4 |
| *Fall and Spring* | | |
| Beh Sci 220 | Applications to Leadership | 1½ |
| Econ 221 | Economics of National Security | 3 |
| Econ 222 | Principles of Economics | 1½ |
| El Engr 210 | Digital Signals and Systems | 3 |
| English 212 | Composition and Speech | 3 |
| Eng 110 | Engineering Fundamentals | 3 |
| History 202 | Modern Warfare and Society | 3 |
| Mgt 203 | Introduction to Management | 1½ |
| Math 210 | Differential Equations and Matrices | 3 |
| Math 220 | Probability and Statistics | 3 |
| Mech 210 | Engineering Materials | 3 |
| Physics 211 | General Physics I | 3 |
| Pol Sci 200 | Introduction to Government | 1½ |
| Pol Sci 201 | American Government | 1½ |
| Pol Sci 203 | International Political Systems | 1½ |
| PMS 220 | USAF Organizational Communication | 2 |
| Phy Ed 205-206 | Competitive Athletics/Fitness Test | 2 |
| Phy Ed 220 | Physical Education | 1 |
| | | 41 |

| COURSE NUMBER | COURSE TITLE | SEMESTER HOURS |
|---|---|---|
| | **Second Class (Junior)** | |
| *Summer* | | |
| Mil Tng 300 | Summer Military Options | 4 |
| *Fall and Spring* | | |
| Aero 311 | Fundamentals of Aeronautics | 3 |
| Aero 312 | Intro to Engineering Thermodynamics | 3 |
| Beh Sci 330 | Applications to Leadership | 1½ |
| El Engr 310 | Electronic Circuits and Systems | 3 |
| English 330 | Technical Writing or | |
| or 350 | Advanced Composition | 3 |
| History 303 | The US in a Changing World | 1½ |
| Law 300 | Introduction to Law | 3 |
| Philos 310 | Ethics | 3 |
| Physics 311 | General Physics II | 3 |
| Electives | Academic Electives | 12 |
| PMS 330 | USAF Employment Concepts | 2 |
| Mil Stu | Military Studies Options | 3 |
| Phy Ed 305-306 | Competitive Athletics/Fitness Test | 2 |
| Phy Ed 320 | Physical Education | 1 |
| | | 41 |
| | **First Class (Senior)** | |
| *Summer* | | |
| Mil Tng 400 | Summer Military Options | 2 |
| | Flight Core[1] | 3 |
| | | 5 |
| *Fall* or *Spring* | | |
| Astro 332 | Introduction to Astronautics | 3 |
| Engr 430 | Engineering Systems Design | 3 |
| English 406 | Values in Literature | 3 |
| Law 400 | Law for Commanders | 3 |
| Physics 411 | Modern Physics | 3 |
| Pol Sci 412 | Defense Policy | 3 |
| Electives | Academic Electives | 15 to 21 |
| PMS 440 | Military Theory and Force Analysis | 3 |
| Phy Ed 405-406 | Competitive Athletics/Aerobics Test | 2 |
| Phy Ed 420 | Physical Education | 1 |
| | | 39 to 45 |
| | TOTALS | |
| | Academic Core Courses | 111 |
| | Academic Major Courses | 27 to 33 |
| | Military/Aviation Courses | 27 to 30 |
| | PE/Athletics Courses | 14 |
| | Total Curriculum[2] | 179 to 188 |

[1]Flight core may be taken summer, fall or spring.

[2]Total curriculum hours depend on major selected and flight core scheduling.

# The Cadet Challenge

THE Academy wants to be frank with you about what to expect if you become a cadet. The transition from civilian to cadet life is not easy. Satisfying all phases of education and training through four years as a cadet calls for application, dedication, sacrifice, and stamina.

Before you make a decision about applying for the Academy, you should ask yourself this question, "Why am I interested in attending the Air Force Academy?" Your primary motivation for seeking an appointment is most important, so you should carefully examine your reasons. First, you should make sure the Academy is *your own* choice. Do not let your parents, your friends, or others influence your decision. The Academy has found that outside influence, no matter how well intentioned, seldom provides sufficient desire for a cadet to overcome all the problems that will be encountered.

Be certain that you are not primarily motivated to gain the prestige of attending a service academy. Although Academy cadets may be admired by their associates, cadet life from the inside looking out is not always glamorous. The fourth class (freshman) year is especially difficult. It is a year of development in a totally new environment. As a fourth class cadet your personal freedom and privileges to be away from the Academy will be limited. As you progress through the years, you will have more privileges, but along with the increased freedom you will have more responsibilities of leadership in the Cadet Wing.

Be reasonably sure that you want to attempt the military life of a cadet and an Air Force officer. Ordinarily, young men and women do not have their careers totally charted when they graduate from high school. Therefore, if you simply do your part to investigate the Academy and opportunities in the Air Force, that is all we expect of you. Further information and motivation will be provided after you become a cadet.

Be sure that you are willing to remain flexible about the career area to which you may be assigned immediately upon graduation. Although there are a variety of career areas in this age of expanding technology, those available each year will depend upon the needs of the Air Force at the time. Refer to the Air Force Career chapter. Additional information and counseling on career opportunities will be explained fully if you become a cadet.

Be sure that you do not seek an Academy appointment just to receive a four-year cadet scholarship. In return for the government's investment in your education and training, you will be expected to learn, to perform, to obey, and to lead. The Academy has an obligation to the Air Force, to the Congress, and to the American taxpayers to produce professional military officers. And you, in turn, have a responsibility to those groups to do your best.

If your primary motivation is to accept the challenges of the total Academy program and service in the Air Force, then you have passed the first test toward making a positive decision. Before making your final decision about applying for the Academy, you are advised to weigh all of your characteristics against the typical qualities of a successful cadet and an officer. If you enjoy responsibility and accept discipline, welcome new experiences and opportunities, and like to excel and lead others, you should have the attributes to become a successful cadet. And if you find satisfaction in serving others through a sense of duty and morality, you should also have the assets to serve your country as an officer. Your decision is important.

# LEADERSHIP PROGRAM

THE Academy's leadership program is directed by the Commandant of Cadets. The instruction is based on a four-year progression from a basic cadet without military experience to an Air Force officer with the knowledge, skills, and motivation for this profession.

Leadership is based on the whole person concept, meaning that many attributes of character, dedication, and professionalism are necessary to complement your academic education and complete your preparation for Air Force service. Fulfilling these high standards of performance, conduct, and military bearing is not easy. As you develop you will realize that worthwhile goals in life do not often come easy, but in the long run the rewards are usually worth the efforts. You realize, also, that your challenge of leadership could involve great responsibility in terms of national and international security.

Leadership revolves around the primary mission of the Air Force, which is to fly and — when the government so directs — to fight in defense of national interests. Since the mission is based on flying, the aviation training you receive as a cadet is a significant part of your career preparation.

During fall and spring semesters, you will have classroom instruction in military studies including special presentations by well known military and civilian leaders. You will be active in many types of summer military and aviation training to develop leadership ability. You will be evaluated on your performance in these training programs which are an important part of your cadet progress and graduation requirements from the Academy.

# BASIC CADET TRAINING

Your first exposure to military life occurs in BCT, a rigorous program of orientation held during the summer you enter the Academy. Your performance and attitude in this program are critical factors in your future success at the Academy. Since it is vitally important for you to understand what is expected of you, a detailed description is given as follows:

## Arrival

When you arrive at the Academy, you may be on your own, away from home, for the first time. Although there are many

others in your class you may not know anyone. You could suddenly feel alone in a strange new environment without parents or friends to turn to. But remember, you are not alone and almost everyone else feels the same way you do.

You will soon make friends among your classmates, including some from your own state or area. Communication between members of your own class is encouraged to help build a sense of togetherness and esprit de corps. Upperclass cadets are available to help you adjust to the Academy and give you a sense of identity and belonging. Regular question and answer sessions are held to encourage understanding between basic cadets and upperclass cadets.

During the first few days you are busy with clothing issue, forms, medical review, validation exams, and squadron and dormitory room assignments. Your hair is cut in a short style for ease and comfort during the summer training.

## Oath

Taking the oath to enter the armed forces of the United States is one of the biggest decisions of your life so far. By this pledge of loyalty, you promise to support and defend the Constitution of the United States against all enemies and to discharge faithfully your duties as a cadet. The oath is a commitment to carry out national objectives established by civilian leaders in congressional and executive branches of government. You must be willing to abide by their policies in times of peace or war. If you have any reservations about taking the oath, you must resolve them in your own mind before accepting an appointment.

## Transition

After processing is completed, your transition to military life begins with six weeks of BCT. Upperclass cadets serve as instructors during your summer training. These cadets, who have been put through the same strenuous program, expect your best. Throughout the summer everything is a stiff challenge, highly competitive, and rapidly paced. The program will tax your endurance and force you to find hidden reserves of energy to keep up. The difference between the Academy and a civilian college become clear as you face the duties placed upon you.

You will have many tasks to do and a minimum of time to accomplish them. All of this has a purpose: to involve you in a number of activities and teach you how to perform effectively in a short time. If you are motivated to do your best, you will meet the challenges and reach new heights of performance and achievement. Upperclass cadets are available to help motivate you through positive reinforcement of your abilities and leadership techniques designed to stimulate your success.

## BCT in the Cadet Area

One of the first things you learn is how to march and drill. You perform close order drill and the manual of arms, and you learn to march in military ceremonies and parades. Physical conditioning is a part of your daily training which includes exercises, running, swimming, and competitive sports. The physical exertion is strenuous and tiring. It will be easier if you prepared yourself through vigorous physical conditioning before you entered the Academy. The obstacle course is the supreme test of your physical fitness in which you extend the limits of your ability and build the confidence to face stress. You learn to run the obstacle course, racing against the clock, over, under, and around various barriers.

Your training is not limited to drill and conditioning, but continues even in your room and in the dining hall. You are out of bed by at least six in the morning, and you straighten your room before going to breakfast. You must arrange your belongings and make your bed in a standard way. During strict Saturday morning inspections, you stand at attention while upperclass cadets meticulously check over your room and uniform. You learn to take pride in your personal appearance and the cleanliness of your area. You also learn to eat in a military environment. Although you must follow the rules of conduct, you are allowed ample time to eat. And the food is good, maybe the best dining hall food you could find. It is served family style, but the "family" is very different from yours at home. All cadets eat at the same time in one huge dining area.

In the evenings, you are still busy studying basic hygiene, cadet rules and regulations, and other subjects. You must stand when upperclass cadets or officers enter your room and salute when they leave. You must square corners when walking. Each evening, however, there is time set aside to allow you to relax and attend to personal needs without interference. Then you go to bed for eight hours.

Regular breaks are scheduled each day to give you some time to relax and recover your energy. Also, special programs are arranged which are entirely different from your military training. These include the Arnold Hall social activities, the Chaplains' picnic, and the Dining Out in homes of Air Force personnel and responsible local citizens.

## BCT in Jack's Valley

Jack's Valley is a wooded training area just north of the athletic fields. At this encampment upperclass cadets will put you through rugged training and confidence courses under field conditions.

You wear fatigue uniforms and combat boots, and you live in tents. Life in the valley is challenging and competitive, but you gain satisfaction as your endurance increases.

You develop teamwork in the leadership reaction course as small groups of

basic cadets learn to solve problems and work together. Patrolling and tactical exercises simulate the operation of small units in combat. On the assault course you go through obstacles, bayonet drills and basic combat exercises. You learn to fire the M-16 rifle. The confidence course takes you through another series of obstacles. Teamwork and encouragement from classmates, along with your own pride and spirit, enable you to make it through this difficult course. In spite of your physical exhaustion at the end of each day, you find Jack's Valley is a different and stimulating experience.

## Field Day

The final competition at the end of BCT occurs on Field Day. Now you are highly conditioned physically and will discover a sense of pride and self-esteem that you have not experienced before. You and your squadron teammates compete against the other BCT squadrons in events such as distance races, log relay, rope pull, push ball, and other selected events. This gives you a final chance to demonstrate your new confidence and progress, not only to the upperclass cadets but to hundreds of spectators as well. It shows how well your squadron pulls together as a team to gain additional points toward winning the honor squadron competition. Winning at Field Day takes the same kind of spirit and teamwork that have carried you through the summer. To close the day's events, the cadet parachute team lands in the athletic area with a streamer for the flag of the winning squadron.

## Acceptance Parade

After BCT when the rest of the Cadet Wing has returned from summer programs, you will receive your shoulder boards during the Acceptance Parade. You are now officially accepted into the Cadet Wing. The upperclass cadets are smiling, you notice, and you can appreciate them and the tasks they put you through during the summer. You have gained spirit, toughness, patience, pride, and teamwork. You are physically and mentally prepared for the challenges of your fourth class year.

## Parents' Weekend

Over the Labor Day holiday, the Academy invites the parents of all fourth class cadets to visit their sons and daughters and attend scheduled functions. A special event of this weekend is a Cadet Wing parade. The cadet squadrons hold an open house and sponsor various activities. The Superintendent, Dean of the Faculty, Commandant of Cadets, and other members of the staff will brief the parents. Cadet facilities are open to them including the academic building, dormitories, field house, gymnasium, chapel and dining hall. Social functions, a chapel service, and a band concert are scheduled. Fourth class cadets are authorized to leave the Academy at scheduled times during that weekend. Hotel and motel accommodations are available to parents near the Academy in Colorado Springs.

# MILITARY TRAINING

## Fourth Class Year

In mid-August, you enter the fourth class academic year, consisting of fall and spring semesters. Military training during this year places you in the role of a follower as a necessary first step in your leadership development. In this role you are challenged both physically and mentally to increase your self-confidence and self-discipline. You are provided with a practical and useful perspective of leadership. This is the Functional Concept of Leadership in which you are given opportunities to analyze yourself and other cadets in leadership situations. This concept was introduced to you during BCT when you were asked to analyze your classmates. Now as a fourth class cadet, you will continue this practice by analyzing the performance of upperclass cadets in leadership positions.

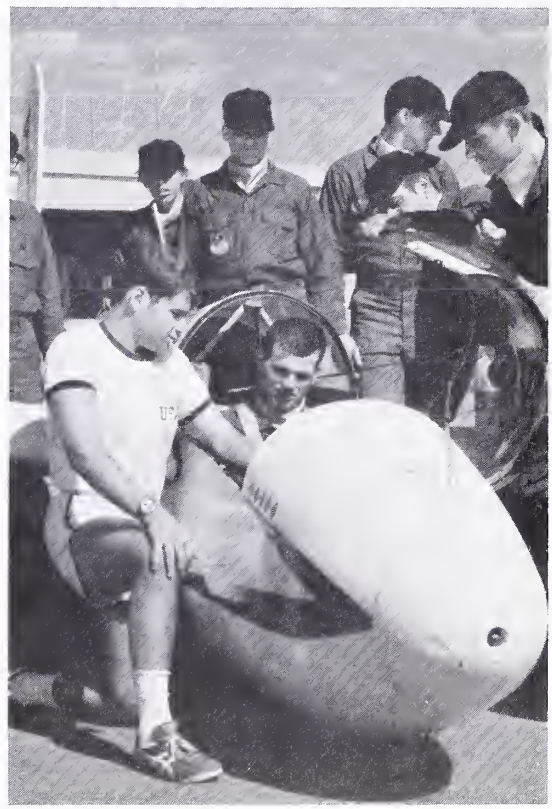
Your first military studies course helps you to understand the operation of the Air Force in support of national objectives and the responsibilities of the officer in accomplishing these goals. You study many aspects of leadership within the Air Force and the Cadet Wing, including the practical duties performed by the military manager. You gain an insight into the life of officers, their career patterns, promotion opportunities and pay benefits.

## Third Class Year

All cadets must take SERE (survival, evasion, resistance and escape) training during their third class summer. The training is conducted at the Academy and in the nearby Rocky Mountains. The course is fully accredited by the Air Force and fulfills the survival training requirements for Air Force personnel. In addition to SERE training, you must choose one of two three-week programs:

*Operation Non-Com*—Service at Air Force installations to observe and gain a better understanding of the duties of enlisted personnel.

*The Soaring/Parachuting Program*—Instruction in ground school and dual and solo flights in Academy sailplanes which can be applied toward an FAA Pilot Certificate-Glider Rating. Instruction in emergency use of parachute. Familiarizes cadet with emergency and free-fall parachuting as it pertains to a future Air Force career.



*Special Training Programs*—Participation in temporary programs conducted to test a new concept prior to implementation.

During the academic year, you begin to leave the followership role and assume limited leadership positions in the Cadet Wing. You take a second course in military studies to assist you in accomplishing these

duties and to prepare you for ever increasing responsibilities in your second and first class years. The course focuses attention on developing communication skills which cadets and officers should possess to be effective leaders. You learn the techniques of teaching and speaking that will help you to communicate as a leader. You will also participate in assuming instructional and leadership roles. Through those roles, you practice the communication techniques which are of primary importance when you become an instructor of lowerclass cadets and a leader in the Cadet Wing.

## Second and First Class Years

Primary emphasis during the final two years is placed on increased leadership responsibility and practical knowledge of how the Air Force operates. Upperclass cadet instructors provide most of the training in aviation and leadership programs. Cadets serve as instructors in basic cadet training, parachuting, soaring, navigation, and other programs.

You must assume at least one leadership position in a summer program for third or fourth class cadets. You must participate in Operation Third Lieutenant if you have not completed Operation Non Com in your third class summer. In addition, you will select optional summer programs from among the following:

*Parachuting* — Offers the option of attending Basic Airborne Training at Fort Benning or participating in free-fall parachuting programs at the Academy (if not selected during your third class summer).

*Soaring* — Advanced programs are available to those who have completed the basic course.

*Light Plane Flying* — Required for all first class cadets who will enter Air Force pilot training following graduation. Instruction is conducted in T-41 aircraft at the Academy Airfield. It includes dual and solo flight training with related ground school.

*Aviation* — Required of all cadets not programmed for entry into pilot training.

Knowledge is gained of the Air Force flying mission through academics, trainers, simulators, and flight experience in T-43 jet aircraft.

*Navigation Instructor* — Offers selected cadets technical and professional training as flight instructors in other aviation courses. Leadership and skill training parallels future operational Air Force flying roles.

In your second class academic year, you take a third military studies course which emphasizes force employment concepts and military doctrine. Information is included on current weapon systems and their employment in offensive and defensive airpower. The course is held in a workshop environment where each cadet is given an opportunity to make decisions governing the simulated tactical employment of operational units.

As the final step in the leadership program prior to your graduation and commissioning as an officer, you will take full responsibility for the leadership and training of the other three classes. The fourth military studies course provides the foundation of professional military thought upon which you will be able to build throughout your military career. Instruction is also provided on the responsibilities of a junior officer.

# AVIATION INSTRUCTION

The flight environment provides a varied exposure to aviation throughout your years at the Academy. Some courses are mandatory to insure that every cadet receives a broad aviation background. The remainder are electives available in the fall, spring or summer.

Your aviation education begins during BCT with orientation flights in a sailplane, a helicopter, and a jet navigation trainer. The early timing of this training, during your rigorous transition from civilian to military life, is designed to provide a clear realization of your future role in the flying Air Force.

## Soaring Program

During BCT, you will be given a sailplane orientation flight over the Academy. Future soaring training, held on a year-round basis, is available to cadet volunteers. The basic course includes dual and solo instruction involving approximately 25 flights. Advanced instruction leads cadets through various FAA (Federal Aeronautics Administration) ratings. All training is conducted in Academy sailplanes and supervised by highly qualified Air Force personnel. Primary flight instruction is given by cadet instructors.

## Parachute Training

Parachute training is available at the Academy to selected cadets who volunteer and meet stringent physical requirements. The basic course, which involves five free-fall jumps, trains you for an emergency egress from a disabled aircraft. Selected cadets from the basic course will progress through the advanced courses to become parachute instructors. These cadet instructors have the opportunity to be members of the Academy's parachute team which has been highly successful in precision parachute competition.

Air Force aircraft are used for parachute training with supervision provided by the airmanship staff. Most of the training is given by certified cadet jumpmasters who have completed the advanced parachute program and have proved their capabilities.

## Aviation Fundamentals

During the fourth class year, all cadets must take a basic course in Air Force flight activities, operations and space environment. You will receive simulator rides, a T-43 flight mission to an Air Force base, and presentations in the Planetarium. You will study orientation to basic aerodynamics, radar navigation, flight instrumentation, avionics and space operations. A more advanced course in aviation fundamentals is required of first class cadets who are not scheduled to go to Air Force undergraduate pilot training after graduation. This course will fulfill the flight core requirement of the curriculum.

## Pilot Indoctrination

First class cadets who plan to enter undergraduate pilot training must take a T-41 pilot indoctrination course as their flight core requirement. The T-41 aircraft is a military version of the Cessna 172. The instruction is conducted at the Academy Airfield by the 557th Flying Training Squadron of the Air Training Command. This training, including duals and solo flights, totals approximately 25 hours. Associated ground school courses are taught in conjunction with the flying training. If you qualify for this course, you may have your first chance to solo a powered aircraft which is a memorable achievement of your final year at the Academy.

## Aviation Science

Several courses in aviation science are open to all cadets. These courses provide you with firsthand flight experience while furthering your knowledge and understanding of the flight environment. The courses enable you to learn flight concepts, instruments and atmospheric factors in an academic environment. This background is the basis for practical application in flight trainers and cockpit simulators. The skills achieved in the classroom and laboratory are then applied during flight missions in the T-43 aircraft, normally accomplished during regular academic days.

You will also be scheduled for a weekend cross-country flight to a prominent Air Force installation, where you will be exposed to various operational flying units. You will meet and talk with crew members and senior officers about various aspects of the Air Force.

Other aviation science courses enable you to study the avionics systems of current and future aircraft and to work with some of this equipment in flight. You may also have the opportunity to achieve cadet instructor navigator status and provide instructional support to cadets in basic navigation courses. If planning to attend navigator training, you may take an applied course which allows you to validate part of the undergraduate navigator curriculum.

## Astronomy Program

An astronomy program provides courses dealing with the space environment. The Planetarium, Observatory, and T-43 Airborne Laboratory involve cadets in both the observational and theoretical actions in the oldest of sciences. The astronomy and space science courses are open to all cadets. They incorporate the latest results of the space program and scientific speculations about the future. Flight missions provide the opportunity to visit major observatories and space facilities for a closeup look at the most recent developments in space technology.

## Extracurricular Flying

If you want to pursue flying as a cadet extracurricular activity, you may take additional light plane training as a member of the Cadet Aviation Club. You may earn FAA ratings from private pilot through instructor pilot. Flight training is available beginning the second semester of your fourth class year. Training is conducted in club aircraft which includes four Cessna 172s, a Beechcraft Sundowner, a Beechcraft Sierra, and two Grumman American Travelers. Instruction is given by both military and civilian personnel who are certified FAA flight instructors. Cadets must pay a nominal fee for the instruction.

# ACADEMIC PROGRAM

THE academic program, under the direction of the Dean of the Faculty, allows men and women cadets to acquire a broad education in the basic and engineering sciences and the social sciences and humanities. You will be required to complete a balanced sequence of prescribed courses in all of those areas. You must choose a major in one area and fulfill the requirements for a degree. Elective enrichment courses are offered to cadets who have the talents and interests to pursue further study.

The total academic curriculum is designed to develop future Air Force officers whose minds are innovative, analytical, and resourceful. Classroom instruction encourages you to communicate and express your ideas, thereby developing the intellectual traits of leadership. The enrichment program encourages you to develop your full academic potential and to acquire a background for possible graduate education during your future career.

After you complete basic cadet training, you will be enrolled in academic classes as a fourth class cadet. The same expectations of achievement and performance required of you during the summer training are carried over into academics. You must learn to budget your time and study regularly in order to accomplish the academic workload, which will seem extensive in comparison to your previous requirements in high school.

Each cadet must earn at least 179 semester hours of credit, which is greater than the requirements of a civilian university. Academic courses are given during each fall and spring semester, and selected courses are offered in the summer terms.

## Academic Core Courses

During your fourth and third class years, you will concentrate on prescribed core courses. In later years your program will contain more major courses. The standard sequence required of most cadets is shown in the Summary of the Curriculum. In a two-course sequence, the first course is offered in the fall semester and the second course in the spring. Single course offerings are split between fall and spring to help balance departmental workloads. Cadets with advanced standing will take some courses ahead of schedule.

## Academic Majors

After spending three semesters taking a diversity of core courses, you will be prepared to select a major that suits your interests and aptitudes. Faculty advisors will explain the requirements of all majors. You may consult with an advisor and request assistance in choosing your major. You must make a selection before registering for the spring semester of your third class year. Most cadets, especially those who select science and engineering majors, will choose earlier. When you make a selection, you will be assigned an advisor to assist you in planning a course program for future semesters. You will take the remaining core courses along with those required for your major.

The following majors are offered:

DISCIPLINARY MAJORS

*Science and Engineering*

- Aeronautical Engineering
- Astronautical Engineering
- Biological Sciences
- Chemistry
- Civil Engineering
- Computer Science
- Electrical Engineering
- Engineering Mechanics
- Engineering Sciences
- Mathematical Sciences
- Physics

*Social Sciences and Humanities*

- Behavioral Sciences
- Economics
- Geography
- History
- International Affairs
- Management

INTERDISCIPLINARY MAJOR

- Operations Research

DIVISIONAL MAJORS

- Basic Sciences
- Engineering
- Humanities
- Social Sciences

INTERDIVISIONAL MAJOR

- Aviation Sciences

## The Enrichment Program

When cadets first enter the Academy, they must take a battery of placement/validation tests offered by the various academic departments. Based on these tests cadets are enrolled into their first semester courses on their individual ability, preparation, and achievement. During your years at the Academy, you may participate in the enrichment program in the following ways:

### *Transfer Credit*

Credit may be awarded for any college course satisfactorily completed which is equivalent to a course in the Academy curriculum. This allows you to substitute other courses for those omitted through transfer credit.

### *Validation*

Special competence may have been gained through honors courses in high school, through College Board advanced placement tests, or other experience that will enable you to complete validation examinations to satisfy the requirements for comparable Academy courses. You may choose a substitute elective for a course satisfactorily validated.

### *Acceleration*

If you have special preparation or above-average ability in a subject, you may be placed in accelerated courses which complete the requirements for a two-course sequence in one semester. Such courses are currently offered in chemistry.

### *Advanced Placement*

If you have a special preparation or above-average ability, you may also be placed in an advanced course of a multi-course sequence. Upon successful completion of the advanced course, you receive validation credit for prior courses in the sequence. Such placement is currently accomplished in core mathematics courses.

### *Substitution*

Advanced course versions are offered as substitutes for some of the prescribed courses. They allow you to concentrate on a subject in greater depth or to satisfy requirements for a particular major.

### *Overload*

Cadets who maintain a 2.60 GPA may enroll in one course beyond the normal semester requirement. Cadets who maintain a 3.25 GPA may enroll in two courses beyond the normal semester requirement. This allows you to have a wider latitude in your course selection.

### *Audit*

First and second class cadets who maintain a 2.60 GPA may audit one course beyond the normal semester requirement. However, you may not take an overload course in addition to an audit course. Cadets who maintain a 3.25 GPA may audit one course and overload another course. You are not required to take examinations in these courses. Audited courses will not appear on transcripts.

Because of federal statutes the enrichment program does not allow a cadet to graduate in less than four years. The program, on the other hand, does encourage you to take additional courses in your major field of interest, or to take diverse elective courses.

Individual initiative is encouraged through the enrichment program. A course entitled Independent Study, consisting of research work by cadets on topics of their own choosing, is offered to upperclass cadets by each academic department. Term papers and laboratory experiments provide other opportunities for you to engage in your own research.

Every effort is made to keep the content of courses up-to-date and abreast of current developments. To cover contemporary topics or provide special courses requested by cadets, each academic department may offer a course entitled Special Topics. The content of these courses may change from semester to semester and may cover a wide range of topics.

## The Academic Honors Program

All academic departments offer honors versions of core courses to cadets who are qualified for more in-depth study of the course material. Additionally, each academic division offers one integrated divisional honors seminar which relates to each discipline in the division.

Each department determines specific selection criteria although a minimum GPA of 3.0 normally is required for core honors courses, unless special permission is granted by the appropriate department head.

Participation in core honors courses is voluntary, and cadets may return to the corresponding core course voluntarily or by direction at any point during the course.

Cadets may qualify to have an "honors" designation on their Bachelor of Science degree if they complete the following requirements:

1. 51 semester hours of core honors courses with at least 9 semester hours selected from core courses in each of the four academic divisions.
2. One integrated divisional honors seminar.
3. 3.0 cumulative GPA and 3.5 GPA in all honors courses.

## Foreign Exchange Programs

The Air Force Academy currently has an exchange program with France, affording selected cadets the opportunity to learn more about the organization, philosophy, and operation of the French Academy.

Each fall semester, not more than ten cadets from the Air Force Academy exchange places with cadets from the Ecole de l'Air (French Air Force Academy). The program includes student participation in the academic, military, and athletic activities of the host academy for the semester.

Reciprocal visits, for various lengths of time, are also arranged with academies of other allied countries such as Britain, Canada, and Argentina. In addition, the Academy receives visiting cadets from several allied foreign academies.

## Interservice Exchange Program

The Air Force Academy has exchange programs with the United States Military Academy, the Naval Academy, and the Coast Guard Academy. During one semester small groups of Air Force cadets attend the other academies, while the Air Force Academy reciprocates by receiving the same number of cadets from those schools. The purpose of this exchange is to provide future military leaders with a better understanding of the other service academies and to develop a degree of uniformity among programs at the academies.

## Graduate Education

The Air Force encourages Academy graduates to continue their education by attending civilian graduate schools. During their first class year, cadets may apply for scholarships which begin soon after graduation. Graduates who did not receive scholarships may apply for master's degree programs through the Air Force Institute of Technology after serving on active duty for a few years. An expanded description of these programs is included in the Air Force Career chapter.

## Accreditation

The Air Force Academy is a fully accredited institution of higher learning. The standard Bachelor of Science degree is accredited by the North Central Association of Colleges and Schools. The Engineers' Council for Professional Development, composed of representatives of the major professional engineering societies, has granted accreditation to the majors in Aeronautical Engineering, Astronautical Engineering, Engineering, Civil Engineering, Electrical Engineering, Engineering Mechanics and Engineering Sciences. The Major in Chemistry fulfills the recommendations of the Committee on Professional Training of the American Chemical Society. Cadets who complete the requirements for one of these majors will earn a specified degree: for example, Bachelor of Science in Chemistry.

## The Faculty

Academic courses of study are taught by a faculty composed primarily of Air Force officers. A few officers from the United States Army, Navy, and Marine Corps, and from the military forces of allied nations serve in a liaison capacity. The military faculty is supplemented by a few distinguished visiting professors from civilian colleges and universities and many civilian guest lecturers.

An assignment to the Academy faculty is voluntary, and each applicant is normally given a personal interview. Each faculty member is required to hold a master's degree, and many have earned doctorates. A number of colleges and universities in the United States, as well as some foreign institutions of higher education, are represented in the backgrounds of the Academy faculty.

Faculty members normally serve at the Academy four years. Twenty-one permanent professor positions have been established by law, which include the Dean, the Vice Dean, and department heads. Additionally, the Academy is authorized to retain up to ten percent of the faculty strength in a tenure associate professor status, with appointments renewed on a recurring four-year basis.

Members of the Academy faculty have a responsibility beyond that of teaching their particular courses. They have an obligation to help furnish a continuing motivation for cadets to devote a career to the service of their country. They attempt to accomplish this goal through precept and example as career officers and qualified faculty members. In addition to maintaining close contact with the cadets in the classrooms and as course directors, faculty members serve as sponsors for their extracurricular activities and athletics.

Faculty members perform other functions such as participating in local and national meetings of educational and professional societies. Many of them have made contributions to the literature of their disciplines and to progress in their fields through research projects. During the summer, faculty members often serve other installations of the Air Force as consultants.

An outline of the faculty organization is as follows:

*Division of Basic Sciences*
- Department of Chemical and Biological Sciences
- Department of Mathematical Sciences
- Department of Physics

*Division of Engineering*
- Department of Aeronautics
- Department of Astronautics and Computer Science
- Department of Civil Engineering
- Department of Engineering Mechanics
- Department of Electrical Engineering

*Division of Humanities*
- Department of English
- Department of Foreign Languages
- Department of History
- Department of Philosophy and Fine Arts

*Division of Social Sciences*
- Department of Economics, Geography and Management
- Department of Law
- Department of Behavioral Sciences and Leadership
- Department of Political Science

## Instructional Methods

Faculty members may employ the entire range of teaching techniques including lectures, discussions, demonstrations, tutorials, and seminars. The small size of most Academy classes, usually 15 to 20 cadets, has made the discussion approach practical and popular. The classroom atmosphere is relaxed with free communication between the instructor and cadets. Extra instruction is provided for cadets who need assistance to develop their understanding of a subject and to improve their grades.

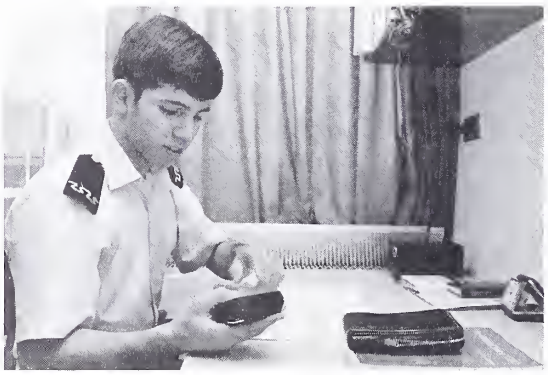
Academy prepared readings, notebooks, and laboratory guides as well as commercially published materials are used by the academic departments. Daily assignments, supplementary reading suggestions, and discussion questions are included in most of the materials.

Departments use a variety of testing techniques, ranging from essay questions and themes to short-answer and multiple-choice items. The nature of the subject matter determines the type of test used. Quizzes are given over class materials at the discretion of the individual instructor. Most departments permit the instructor to construct class tests so that a portion of the final grade will come from measuring instruments devised with total freedom by the instructor. In preparing graded reviews and final examinations, most departments use a committee composed of instructors.

## Curriculum and Scheduling Services

Administration of the curriculum is the responsibility of the Directorate of Curriculum and Scheduling. The directorate prepares the academic calendar, publishes the curriculum handbook, conducts registration, designs the course offering timetable, produces academic schedules, assigns classrooms, and schedules final examinations.

The directorate administers the academic counseling system and monitors the progress of academically deficient cadets. Over 300 officers in the various academic departments serve as advisors to provide guidance to cadets in the selection of core courses and majors. They also counsel cadets who have academic deficiencies or have been placed on academic probation.



## Handheld Scientific Calculators

Handheld scientific calculators have replaced the slide rule as the standard calculation tool in all technical courses at the Academy. These devices are faster, more accurate and versatile than any other means besides a large digital computer. The particular model selected for use by the entering cadet class depends on the curriculum needs, classroom conditions, new models available, and competitive bidding.

A candidate who does not own a hand calculator is advised to wait and acquire one in August at the time of textbook issue. The government wholesale cost will be billed to your cadet pay account, and the 12-month warranty period will be effective throughout your first year of academics.

The acquisition or use of an advanced programmable model is not recommended. The additional capability will be helpful only in advanced courses of your junior and senior years, when such machines will be less expensive or still more advanced for the same unit cost.

If you have questions, write to the Department of Mathematical Sciences (DFMS), USAF Academy CO 80840, or call 303-472-4470.

## Audiovisual Services

The Directorate of Audiovisual Services provides products and services to support all cadet instruction. Among the support resources are libraries of films, slides, audio tapes and photographs. Graphic and photographic personnel prepare a variety of instructional materials and displays for classroom and lab use. A self-help facility is available to cadets and instructors for preparation of simple instructional aids.

Various three-demensional models, exhibits and devices are manufactured by training devices personnel for use in lab experiments and classroom demonstrations. Skilled electronics technicians in the precision measurement equipment lab calibrate and repair all precision-measured instruments and equipment in use at the Academy.

The directorate provides a closed-circuit television system to supplement live classroom instruction. This system is equipped to televise, in color, up to twelve programs simultaneously to any area in the academic building. Instructors can prepare live or videotaped lessons using several production methods.

Directorate personnel teach academic skills courses in reading improvement and typing to cadets. These courses are mandatory for all fourth class cadets, but may be validated.

## Classrooms and Laboratories

Cadet classrooms are located in Fairchild Hall, the large academic building. Most classrooms are designed to accommodate small class sessions to encourage discussion between students and instructors. Eight 46-person rooms and eight 76-person rooms are available when larger classrooms are appropriate to the instruction. These classrooms are in the shape of elongated horseshoes and tiered to provide maximum student-instructor contact. Five large lecture halls are available for assemblies of cadets and for staff and faculty meetings.

The Academy is well equipped with laboratories to supplement science and engineering classes. One of the most outstanding facilities is the Aeronautics Laboratory, housed in a separate building near Fairchild Hall. It is equipped with a subsonic wind tunnel, a supersonic wind tunnel, two shock tubes, and a statically mounted jet and rocket engines. The Department of Aeronautics cosponsors, in conjunction with the Seiler Research Laboratory, the operation of a 17-inch diameter low density shock tube which is the largest device of its kind in the world. The device is used in studying shock induced phenomena, high speed and high altitude instrumentation, and certain astro-geophysical phenomena.

The Instrumentation Laboratory, in conjunction with NASA, is involved in studying the human cardiovascular system. Special instrumentation and techniques are developed to be used in measuring cardiovascular and circulatory parameters in the

environment of both atmospheric and space flight.

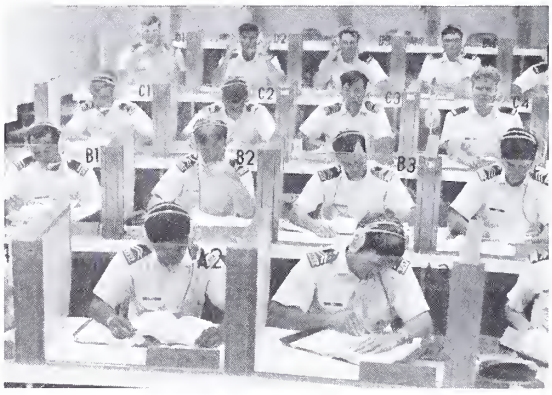
A Radio Frequency Systems Laboratory is primarily concerned with instruction and research in radio systems and electromagnetic phenomena. The laboratory is equipped for experiments in guided electromagnetic waves, plane waves, and radio communications. An antenna range on the laboratory roof is used for testing and developing types of antennas.

The Academy Planetarium is a unique multimedia education and research facility used for cadet instruction in astronomy, navigation, and related academic disciplines. The Planetarium, with a seating capacity of 300, is used for educational demonstrations to school groups and the general public. The projector enables the instructor to simulate a multitude of realistic sky effects on the 50-foot hemispherical star theatre. Movements of stars, planets, comets, meteors and satellites can be duplicated for past, present or future time.

The Academy Observatory, housing a 10-inch telescope, is used by cadets in the study of astronomy.

The Education and Research Computer Center houses a large digital computer supporting remote and batch processing of research and course programs in numerous assembly and higher level programming languages. This center supports every academic discipline and is used by nearly one-half of the Cadet Wing each year as well as several hundred faculty members conducting research.

The Academy has two Foreign Language Laboratories with accommodations for 49 cadets each. The student sits in a sound proof cubicle and responds to the instructor's statements on a tape recorder. By playing back the tapes, students are able to critique their progress in the language.




## Seiler Research Laboratory

The Frank J. Seiler Research Laboratory (FJSRL) is the only scientific lab in the United States Air Force devoted primarily to basic research. It is named in memory of the late Colonel Frank J. Seiler, an Air Force research pioneer. The mission of FJSRL is two-fold: (1) to conduct research in chemistry, aerospace mechanics, and applied mathematics and (2) to encourage and support Academy faculty and cadet research in a variety of disciplines. A resident staff of research scientists works closely with faculty members and cadets on Air Force projects of mutual interest. An inertial guidance lab and facilities for chemical synthesis and analysis are among the research equipment available for use by the FJSRL staff, the faculty and cadets.

# AIR FORCE ACADEMY LIBRARY

The Academy Library serves the academic, research, and recreational reading needs of the Academy. The library also maintains a growing collection of historical aeronautical materials. Many valuable donations from private collections have contributed to making the library a significant resource center for the history of flight.

The book and microfilm collection of the library is comprised of more than 490,000 volumes. Included in this number are subscriptions to more than 2,200 periodicals and 40 newspapers. The scientific and technical report literature includes a collection of more than 310,000 titles, with most of these available on microfiche.

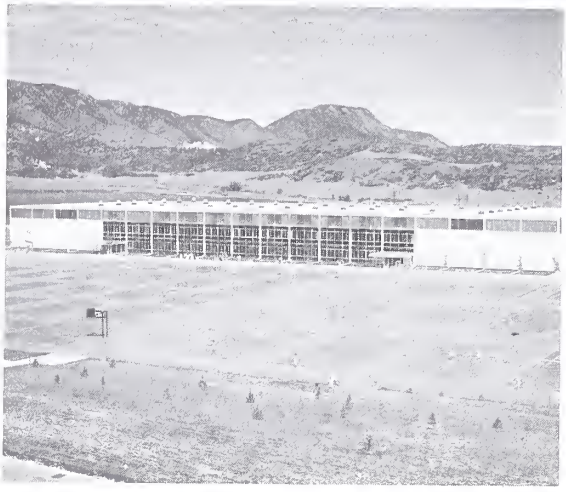
Although the library's reference collection contains standard and specialized reference works in most subject areas, it also includes strong bibliographical collections for identification of research materials that are not held by the library. Such materials are normally obtained on interlibrary loan through use of the facilities of national and regional cooperating libraries and bibliographic centers.

Specialized resource collections and facilities contribute to the excellent service that the library provides to the Academy community. Some of these are the current periodical and newspaper reading rooms, the reserve book room, the microfilm reading room, and the music listening rooms. The audio collection contains records and tapes of classical and contemporary music, drama, poetry, history, and other subjects.

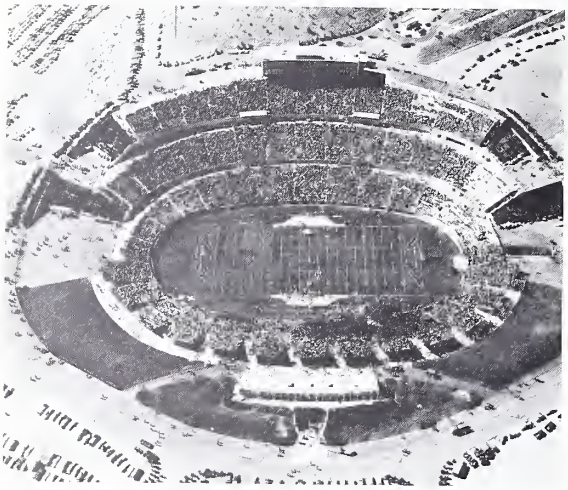
A special collections branch houses complete archival records on the establishment and growth of the Academy as well as materials of historical significance regarding the growth and development of the Air Force. Some other essential resources are the collection of approximately 95,000 government documents, official records of the United Nations, and documents of other international agencies.

The library is an attractive, spacious, and modern facility located at the north end of Fairchild Hall, the academic building. All book stack areas are open to authorized library patrons to afford complete access to the library materials. A professional staff of librarians provides reference and research assistance to cadets and faculty. The assistance is available every day during approximately 90 hours per week that the library is open. The staff compiles selective bibliographies in many subject areas and listings of current acquisitions. They also conduct a complete orientation covering the library's collections, facilities, and services for all new cadets.

The Academy Library administers three branch libraries to serve specialized needs of the entire Air Force Academy community. These are: a Medical Library located in the Academy Hospital; the Law Library used both by cadets in their study of law and by military staff lawyers; and the Community Library equivalent to an Air Force base library. Over 40 smaller reference collections are located in various academic departments and staff agencies.

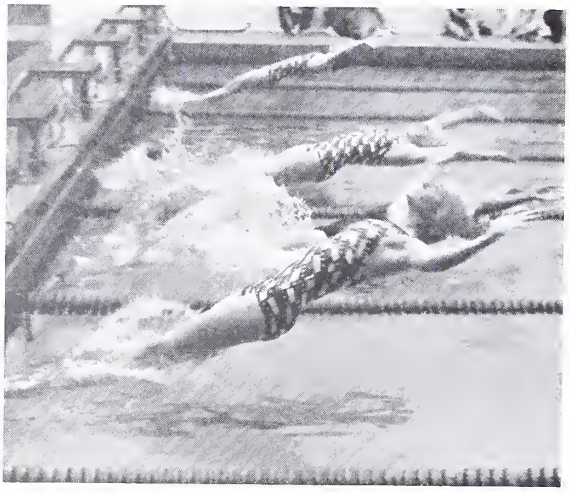


*Cadet Gymnasium*



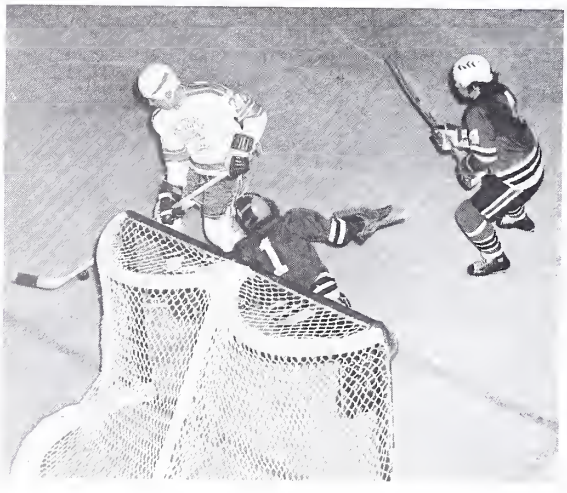
*Falcon Stadium*

*Eisenhower Golf Course*

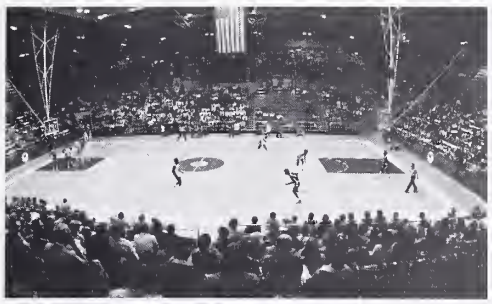


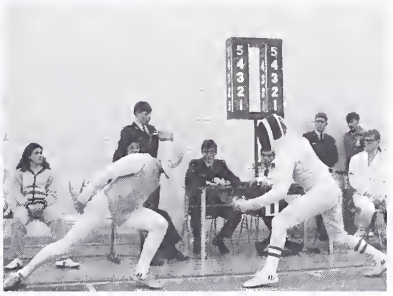
*Olympic Swimming Pool*

*Field House Interior*



*Ice Hockey Rink*



# ATHLETIC PROGRAM

THE athletic program, conducted by the Director of Athletics, makes a vital contribution to your preparation for Air Force leadership. The purposes are:

- To instill such attributes as skill, confidence, initiative, and teamwork through competitive sports;
- To develop useful habits of physical fitness and conditioning;
- To develop courage, self control, and the ability to survive in emergencies;
- To acquire the athletic skills to instruct a variety of sports;
- To gain individual skills for enjoyment of sports after graduation.

The program involves instructional classes conducted by professional physical educators during each fall and spring semester. The instruction expands each year until you perfect your physical coordination, aggressiveness, and techniques. You will learn to participate in many types of sports through intramural contests. You may try for intercollegiate teams which are nationally known in many areas of varsity athletics.

The Academy's athletic facilities are considered to be among the finest in the nation. The Cadet Gymnasium has three full-sized gyms; one Olympic swimming pool and another 40-yard pool; courts for squash, handball, tennis, volleyball and basketball; and a rifle and pistol range. The Field House has an ice rink, a basketball court with seating for 6,600 spectators, and an indoor Tartan track with Astro-Turf infield for all-weather practice. There are also 143 acres of outdoor playing fields and two 18-hole golf courses.

The Academy has made its athletic facilities available for public youth events at times that do not interfere with cadet training. The facilities have been used for the National Sports Festival, Special Olympics, and Colorado High School Easter Races.

# PHYSICAL EDUCATION INSTRUCTION

Physical education for cadets is conducted primarily on a coeducational basis. In some cases separate training for men and women is provided to allow for the physiological differences. The physical education program for the four years is summarized as follows:

## Fourth Class Year

Both men and women cadets undergo a vigorous training program designed to develop physical strength, endurance, agility, and coordination as well as a sense of teamwork and competition. All cadets will take a physical fitness test and a swimming test which require remedial instruction if performance is unsatisfactory. (It is important to learn to swim before entering the Academy. A distance of 500 feet in five minutes should be a minimum goal.) The summer training includes a progressive series of conditioning exercises and runs, sports activities, and inter-squadron field day. This training prepares you for the strenuous physical education and intramural requirements of the academic year.

During the fall and spring semesters, the curriculum stresses coordination, self-confidence, and upper body strength. Women receive instruction in physical conditioning and fencing while men take boxing and wrestling. All cadets are instructed in gymnastics and swimming.

## Third Class Year

A classroom course in physical fitness methods presents sound principles related to diet and weight control, aerobic conditioning, and building of muscular strength and endurance. Lifetime skills to enhance fitness and recreation are accentuated during the remainder of the curriculum. All cadets receive instruction in racquetball, squash, and tennis.

## Second Class Year

Combatives instruction in judo for all cadets emphasizes agressiveness, self confidence, and body development. Aquatic skills and self confidence are further developed by a course in survival swimming. You are exposed to several situations simulating aquatic disasters and emergencies which an Air Force officer may encounter. You are instructed in two additional lifetime sports, golf, and volleyball.

## First Class Year

The progressive development of lifetime sports is continued with your choice of two electives from the following: advanced tennis, basic ice skating, advanced golf, strength training, handball, and badminton. In addition, you will take lifesaving to add to your physical abilities. To complete the instruction in self-defense, a course in unarmed combat exposes you to a multitude of potential hand-to-hand combative situations where you must react confidently, rapidly, and aggressively. Cadets who have not met minimum aquatic standards will receive additional swimming instruction.

# INTRAMURALS

Intramurals are a vital part of the prescribed physical education program and the cadet way of life. All cadets who are not engaged in intercollegiate athletics must participate in intramurals. Each of the 40 cadet squadrons is represented by a team in all 17 intramural sports played during the fall, winter, and spring seasons. Intense and lively competition is generated as the squadrons vie for the Malanaphy Trophy, awarded at the end of the school year to the squadron which achieves the best intramural record. Through intramurals cadets develop physically while gaining experience in both team and individual sports. Cadets are allowed to develop their leadership potential by constructing detailed administrative plans, coaching, and officiating—in effect, managing the entire 680-team intramural program. With the exception of a few contact sports, women cadets participate on a coeducational basis in each sport, competing against other men and women cadets. In addition to the seasonal sports, Wing Open Championships are held each spring in boxing, squash and handball.

The intramural sports include:

*Fall:* football, soccer, flickerball, tennis, and cross country

*Winter:* boxing, wrestling, water polo, handball, volleyball, and squash

*Spring:* rugby, basketball, swimming, team handball, flag football, and racquetball

*Intramural and Intercollegiate Sports*

# INTERCOLLEGIATE ATHLETICS

Intercollegiate athletics provide a source of competition for a large number of cadets to participate in individual or team sports against colleges and universities. The intense competition builds spirit and pride throughout the Cadet Wing.

The intercollegiate sports include:

*Fall:* football, cross country, soccer, water polo, volleyball, tennis

*Winter:* basketball, fencing, gymnastics, swimming, wrestling, ice hockey, indoor track, rifle, pistol

*Spring:* baseball, golf, tennis, track, lacrosse

Both men's and women's teams are fielded in tennis, track, swimming, cross country, basketball, fencing, golf and gymnastics. Volleyball is a sport for women only. Football, soccer, water polo, wrestling, ice hockey and lacrosse are sports for men only. Rifle and pistol teams include both men and women.

Individual men and women cadets and Academy teams recognized for outstanding achievements are provided the opportunity to compete in post-season bowl games and tournaments. Participation in such events reflects the competitive leadership traits desired in future military officers.

The Academy's intercollegiate athletic teams are known as "The Falcons." The Class of 1959, the first graduating class, selected the Falcon as the Cadet Wing Mascot and named it "Mach I," the term indicating the speed of sound. The falcon was chosen because its characteristics in flight are symbolic of the mission of the Air Force. Cadet Falconers, a group of cadets who train the mascots to fly in pursuit of lure, perform demonstrations during half-time activities at football games.

All home games are played in Falcon Stadium located on the site of the Air Force Academy. The Air Force Academy Foundation, an organization of national civic leaders, raised funds to construct the stadium which has a seating capacity of approximately 47,000.

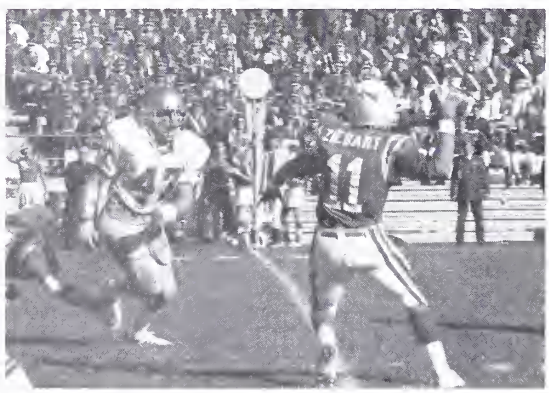
In 1980, the Academy became a member of the Western Athletic Conference (WAC). Academy teams will compete in conference games against eight universities that are members of WAC. Academy teams will continue to compete against Army and Navy and also will play certain universities as scheduled. The 1980 football schedule is as follows:

*Home Games*

| | |
|---|---|
| Sep 20 | San Diego State |
| Oct 11 | Navy |
| Nov 1 | Boston College |
| Nov 15 | Wyoming |

*Away Games*

| | |
|---|---|
| Sep 6 | Colorado State |
| Sep 13 | Washington |
| Sep 27 | Illinois |
| Oct 4 | Yale |
| Oct 18 | Tulane |
| Nov 8 | Army |
| Nov 22 | Notre Dame |
| Nov 29 | Hawaii |



Intercollegiate athletics are financed primarily by the sale of tickets to football, basketball, and ice hockey games. Funds are administered by the Air Force Academy Athletic Association, a self-supporting and non-profit organization. The association provides experienced coaching staffs and athletic equipment. It maintains a central office at the Academy to handle the administration of intercollegiate athletics.


# CADET LIFE

ALL aspects of cadet life add depth and meaning to the Academy and set it apart from civilian universities. Important features of cadet life are the military way you live, the leadership you demonstrate, the excellent facilities available to you, the comradeship you develop with other cadets, the unity and spirit you display, and the duty and honor you live by.

Your life is different from the average college student's in many ways. Your daily schedule is more exacting; your room and personal appearance must be immaculate; the pace you keep is more strenuous; your time away from the Academy is regulated; you must live by an honor code; you cannot marry until after graduation; you cannot own an automobile until your second class year; and you have a limited pay allotment for personal expenditures. The intent of this arduous system is to produce a professional officer with the self-discipline to meet many challenges.

The entire environment of the Academy is designed to produce highly educated and motivated Air Force officers. Attendance at academic, military and athletic activities is compulsory. Many extracurricular and recreational activities are offered on a voluntary basis. The Academy challenges all cadets and provides broad opportunities to develop those qualities necessary to become professional officers.

The Commandant of Cadets is responsible for supervision of most cadet life activities. These activities are administered by the Deputy Commandant for the Cadet Wing, who is assisted by Air Officers Commanding (AOCs) of the cadet groups and squadrons.

## THE CADET WING

After you complete basic cadet training you are a member of the Air Force Academy Cadet Wing until graduation. When you are admitted to the wing, you are a fourth class cadet, equivalent to a freshman. In succeeding years, you will become a third class cadet (sophomore), a second class cadet (junior), and finally, a first class cadet (senior).

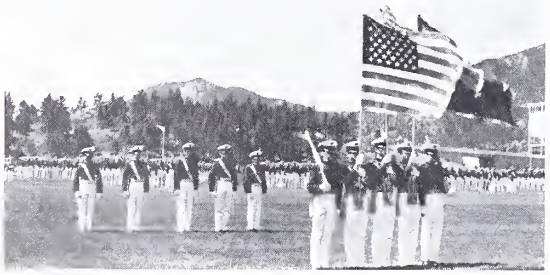
By public law, your commander in the Cadet Wing is the Commandant of Cadets, usually a Brigadier General. The Commandant grants authority for first class cadets to manage all units of the wing under the broad guidance of AOCs. The cadet organization consists of a Cadet Wing Commander and staff, along with commanders and staffs of cadet groups and squadrons. The wing is organized into four groups with ten squadrons each. Women cadets are integrated into the wing and assigned to the same squadrons with men cadets. Women live in various areas in the two dormitories.

The wing is similar to an operational unit in the Air Force and serves as a leadership laboratory for cadets. Command and staff functions of the wing give you a chance to manage a military organization. Upperclass cadets in the wing gain leadership experiences by conducting the rigorous summer training programs for lower classes. You will be taught to lead by instruction, example, accountability, dedication, and honor.

First class cadets are cadet officers in the wing. The wing commander and the group commanders are cadet colonels; the squadron commanders are cadet lieutenant colonels. Cadet majors, captains, and lieutenants act as flight commanders and hold other operational and staff positions. Second and third class cadets may serve in positions as cadet noncommissioned officers. As a fourth class cadet you will not hold rank. You begin leadership development by learning to follow the commands of upperclass cadets.

Within the structure of the wing, cadets may suggest changes of policy. New proposals are evaluated by the Cadet Wing staff and approved or disapproved by the Commandant's staff of commissioned officers. As a military person, you must always remember, however, that rules and regulations sometimes run counter to individual desires. Although you may disagree with some policy, the Academy requires strict compliance on the part of all cadets. When there are practical benefits for both the Academy and the Cadet Wing, a policy or regulation can often be discussed and changed.

**"We will not lie, steal, or cheat, nor tolerate among us anyone who does."**



## CADET PROFESSIONAL ETHICS

Cadet Professional Ethics are the traits which mark a cadet's commitment to personal excellence and produce quality officers to lead the Air Force. The minimum standard of moral behavior is encompassed in the statement of the Cadet Honor Code: "We will not lie, steal, or cheat, nor tolerate among us anyone who does." These simple words provide the cornerstone for the development of a personal code of ethics designed to serve Academy graduates

throughout a lifetime of service to their country. All candidates must be prepared to accept the Honor Code when they enter the Academy. They must also be prepared to live by the principles of Professional Ethics that extend beyond the minimum standards of the code. Some of these principles are: responsibility, confidence, selflessness, courage, honesty, fairness, self-discipline, loyalty, and a keen sense of duty.

The broad program of Professional Ethics is administered and taught by the Cadet Professional Ethics Committee, whose members are elected from the first and second classes in each squadron. Immediately after entering the Academy, you will receive instruction in this program. The instruction is given in an informal atmosphere where you are encouraged to ask questions and resolve any problems which may arise. After you are accepted into the Cadet Wing, you must live by the principles of Professional Ethics including the Honor Code.

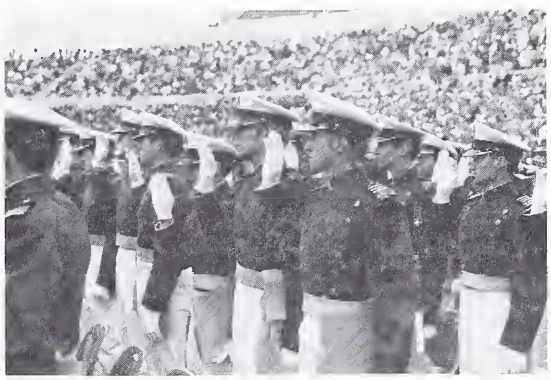
The Honor Code is specific and clear in its demands. You are expected to have complete integrity in both word and deed; you will not lie or quibble; you will do your own work in class. You are expected to report yourself for any Honor Code violation. You are also expected to confront any other cadet whom you believe has violated the code, or to assure that the incident is reported.

Possible breaches of the code are brought before a board of twelve cadets. Two of these are ethics committee representatives and the remaining ten are selected from within the Cadet Wing. A majority vote of nine to three for "violation" of the Honor Code results in a request that the cadet tender his/her resignation from the Academy. Any vote less than nine to three is a finding of "no violation" and the cadet is retained in the Cadet Wing in good standing without prejudice. In exceptional circumstances, the Honor Code Board may recommend to the Commandant of Cadets that discretion be granted to a cadet found in violation of the code. If approved, discretion permits the cadet to be retained in good standing without prejudice. Further, a finding of "violation" without a discretion recommendation may be referred to a Board of Officers for official action. In all of the proceedings, every possible step is taken to protect the rights of the accused.

When you embrace the Honor Code, you are not setting an impossible standard for yourself. Adhering to the code will initially require self-control and conscious effort on your part, but later this will become an ingrained habit and part of your total behavior. A violation of regulations is not considered an honor violation nor are you required to report infractions of regulations. The code is part of a basic moral document covering any substantial matters of honor. By its very wording, the code sets its own boundaries. However, the truly ethical individual regards duty and honor as tightly interwoven.

Beyond the administration of the Honor Code, the principles of Professional Ethics will be taught in many different ways throughout your four years at the Academy. This will include several courses in the academic curriculum containing specific material on ethics.

Academy graduates regard the experience of living under the Honor Code as a cherished possession which helps them cope with the complex problems that face a career officer. Beyond the code, the education in Professional Ethics will provide you with a solid foundation to serve and guide you in the complex responsibilities that lie ahead.



## CADET SCHEDULE

During the academic year you will attend four fifty-minute classes or study periods each morning, followed by assembly for the noon meal formation. There are three periods of classes or study each afternoon. Military training is required on most Wednesday afternoons. Unless you are participating in intercollegiate athletics, you will play on a squadron intramural team two afternoons a week after classes. The other two afternoons after classes are unscheduled, and you may study or conduct personal business. You may volunteer for additional academic instruction conducted during the hour immediately following the end of classes or at any unscheduled time. After dinner you are required to study in your room or in the library. You must be in your room and in bed at taps, unless you have special permission to study late.

The following is a typical daily schedule Monday through Friday during the fall and spring semesters. Saturday mornings are occasionally devoted to parades, inspections and study. Saturday afternoons and Sundays are usually free from duty.

### Typical Daily Schedule

6:40—Breakfast Assembly
7:00—Breakfast
7:30-11:20—Classes or Study Periods
11:40—Lunch Assembly/Parade
11:55-12:20—Lunch
12:40- 3:30—Classes or Study Periods
4:00- 5:50—Intramurals/Drill/Study
6:35- 7:00—Dinner
7:15- 8:00—Military/Activities
8:00-11:00—Study/Military
11:00—Taps

## LEAVES AND PASSES

You are not permitted to have visitors or leave the Academy when you are a basic cadet. As a fourth class cadet, you are normally allowed visitors on Saturday afternoons and evenings and on Sunday mornings and afternoons. You are normally authorized to leave the Academy and go into the local area several times a month. Cadets who are placed on restriction are not allowed visitors or passes. You are occasionally permitted to dine out in the homes of Academy personnel. You will attend home football games and other scheduled events of the Cadet wing.

When you become an upperclass cadet you will be allowed more freedom which will be gradually increased by class. As a third class cadet your free time will still be limited, but when you become a first class cadet, weekends will be free if your performance is up to standard. When granted a Friday or Saturday pass, you will return to the dormitory by taps. When you have a weekend pass, you will normally be allowed to remain away from the Academy from your last military duty Friday or Saturday until Sunday evening study time.

Individual cadets may receive greater of fewer passes than their class quota, depending on individual achievement or deficiency. If you are not performing satisfactorily in miltary training or academic studies, your free time may be restricted. If you are doing above average work in all respects, your free time may be increased.

Most cadets go to Denver, Colorado Springs, or Rocky Mountain recreation areas during off-duty time. As a fourth and third class cadet, you are not permitted to

own an automobile, but may rent or borrow one if you desire. If you have a weekend pass, you are encouraged to use the bus transportation service to and from Colorado Springs and Denver. As a first and second class cadet, you will be permitted to own a car and keep it at the Academy.

You will be granted approximately three weeks of leave each summer, except for your first summer as a basic cadet when you do not have leave. During each of your four years you will have approximately two weeks of leave at Christmas, and one week during the spring. Emergency leave may be granted to you if an emergency involves a member of your immediate family. Other requests for special leave are considered on an individual basis.

## COUNSELING AND ADVISING

During their first year at the Academy, some cadets have a difficult time making the adjustment from civilian to military life. At times during the entire four years, a cadet may have difficulty adjusting. If you should experience such problems, you will be encouraged to seek professional counseling. Many cadets have furthered their academic, military, or personal growth through professional assistance. The following personnel and organizations are involved in the Academy's total counseling program:

*Air Officers Commanding* (AOCs) are responsible for counseling cadets in their squadrons. Each squadron has an Air Officer Commanding and an Associate AOC. They will assist you in adjusting to the cadet way of life and are the primary point of contact between your parents and the Academy. They will monitor your progress, motivation, and attitude. As members of the Commandant's staff, they supervise the discipline system within squadrons and act as mediators when decisions are required. A squadron faculty officer is also available to counsel you in academic areas and to assist you with problems of academic deficiency or probation. Any of these officers will be available whether you simply need someone to talk to, or whether you seek more complete consultation or guidance.

*The Cadet Counseling Center* is a full time counseling facility which closely parallels a typical college counseling service. You will have access to the counselors and to materials and facilities available at the center. Objectives of the center are to assist you in gaining maximum personal satisfaction from cadet life and attaining the highest degree of academic success in your courses.

*The Cadet Career Information Office* will provide you with career information to assist you in making timely and realistic selections of initial Air Force career fields, and will advise you of personnel programs and policies which may affect your career goals.

*Cadet Officers* play a major role in guiding you. They provide much of the military training and athletic supervision within each squadron and assist in tutoring and counseling.

*Academic Counseling and Scheduling* advises you on course scheduling, majors programs, and scholarship opportunities.

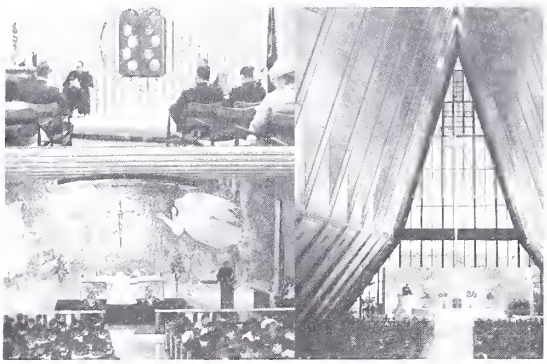
*Faculty Instructors* are available to assist you in academic course work. They also help in selecting major academic fields and developing officer skills.

*Cadet Chaplains* offer counseling in personal, moral, and spiritual matters.

*The Mental Health Clinic*, under the Command Surgeon, offers complete psychiatric service.

## RELIGIOUS ACTIVITIES

The Cadet Chapel is the center of religious activities for the Cadet Wing. This unique structure, with 17 aluminum spires towering 150 feet, serves as a symbol of the Air Force Academy to the public. The stained glass columns separating each of the spires color the chapel interior with ever-changing hues. The chapel contains Protestant, Catholic, and Jewish worship areas and an All-Faith worship room.



Military leaders are responsible for upholding moral values among the men and women within their command. Participation in religious activities is therefore encouraged to develop leadership potential and individual spiritual growth. Participation is not required and attendance at services is optional.

You may participate in any of the following activities: Sunday or Sabbath worship services, daily morning and evening services, special denominational services and activities, cadet choir membership, Bible classes, religious discussion groups, and weekend retreats. Many cadets volunteer to teach Sunday school classes in local religious education programs. There are several cadet fellowship organizations with a large number of cadets participating, both on and off the base.

Religious services are conducted by Air Force Chaplains who are regularly ordained clergymen. In addition to the scheduled religious activities, the chaplains offer individual pastoral care and cadet counseling services. Guest ministers and lecturers are featured at the services periodically. Attendance at church services in local communities is permitted when cadets are free from duty.

## CADET DORMITORIES

You will live in one of two large dormitories which are designed to house two or three cadets to a room. The dormitories contain a post office, shoe repair shop, a cadet tailor shop, cadet banking facilities, barber shop, and beauty shop. Each dormitory also contains pick-up and delivery points for cadet laundry and dry cleaning. There are squadron meeting rooms and cadet club activity rooms located throughout both dormitories. Located in Vandenberg Hall, the larger of the two dormitories, is a Cadet Store which stocks clothing, personal items, academic supplies, electronic equipment, sporting goods, and gift items.

## CADET DINING HALL

One of the highlights of cadet life is the noon meal formation and the marching of the entire Cadet Wing to the dining hall. Either the Cadet Drum and Bugle Corps or the Academy Band plays for the event, which is viewed by visitors from an overlook north of the Chapel.

The cadet dining hall, containing more than one and one-half acres of unobstructed floor space, accommodates the entire Cadet Wing at one sitting. Three meals a day provide ample and nourishing food to sustain you in the vigorous programs of cadet activity. The dining hall does not prepare special dietary menus for members of religious faiths or for individual convictions, because of the many problems involved in varying the menus for a few cadets.

## MEDICAL SERVICES

The Academy has excellent, convenient medical facilities. A cadet dispensary in Fairchild Hall provides out-patient treatment and physical examinations. A cadet dental clinic in Sijan Hall provides complete dental care, including orthodontia. The Academy Hospital, about two miles from the cadet area, is fully equipped and staffed with physicians and specialists. If you must be hospitalized, your academic studies may continue through a special program between the hospital and the academic faculty. If medically able, you will receive academic instruction either at your bedside or in a classroom in the hospital.

## LEGAL SERVICES

The Academy provides confidential advice and assistance to cadets on personal legal matters. If you have any legal problems or need help in preparation of legal documents, the professional legal staff at the Academy will be available to you. The staff includes all officers assigned to the Department of Law and to the office of Staff Judge Advocate. The staff is not permitted to represent military clients in civilian courts.

## CADET UNIFORMS

Cadets wear a variety of uniform combinations, depending upon the occasion and the weather. During the academic year, they wear a classroom uniform. The class uniform for men is a blue shirt and trousers; for women it is a blue blouse with a skirt or slacks. The uniform is worn with a jacket in cool weather and with a parka in cold weather. A blue uniform for dress occasions is provided, with a skirt matching the jacket for women and trousers for men. Other uniforms are the mess dress for formal social functions, parade dress for formal ceremonies, and utility fatigues for field training.

First, second and third class cadets may wear civilian clothes when on leave and weekend passes. Fourth class cadets are not permitted to wear civilian clothing until Christmas leave period.

## CADET BENEFITS

You will receive your education, room, meals, and medical care at government expense. A monthly allotment adequately covers the cost of uniforms, books, supplies, and personal needs. You are prohibited from accepting any other grant or scholarship aid, unless the donor allows you to use the financial assistance for personal expense only. Your pay and allowances are considered sufficient for you to be self-supporting, provided you are economical. The pay is not sufficient to cover any debts contracted prior to entrance, to send money home to your parents, or to spend for luxury entertainment or expensive personal items. The money is carefully allocated monthly to cover your obligations with a modest amount left for personal spending.

Included in the cadet budget is a provision for saving $1,000. This amount is furnished to you upon graduation so that you may purchase uniforms and meet other initial expenses as an officer. Additionally, the cadet budget contains provisions that allow those cadets who do not have sufficient funds available to obtain interest-free loans to cover any emergency situation.

Government-sponsored life insurance is provided at your option. You may obtain $5,000 to $20,000 coverage at $.75 per month per $5,000 coverage. A special commercial insurance plan is available to you on a voluntary basis. The plan provides $20,000 term life insurance for $3.25 per month, which is set aside from your monthly pay. This insurance policy may be carried forward after graduation.

*The Cadet Chorale performed for the Academy's 25th Anniversary.*

*The Cadet Sabre Drill Team gave spectacular performances.*

*The Cadet Dramatic Society staged "Barefoot in the Park."*

*Cadets served as escorts for the International Special Olympics.*


*Blue Tube won first place in intercollegiate broadcasting competition.*

*The Cadet Forensic Association won nine first-place sweepstakes.*

## CADET ACTIVITIES

Life at the Academy offers a wide choice of over 75 activities which the cadets have originated and continued on a voluntary participation basis. These activities enble you to develop your professional interests, creative talents, hobbies, and leadership potential. Some of the activities provide opportunities for competition with regional or national teams. Weekend trips are arranged in connection with some of the events. The organized activities for women and men cadets are as follows:

### Cadet Wing Media

Contrails Calendar Staff
Dodo Newspaper Staff
Polaris Yearbook Staff
Talon Magazine Staff
KAFA Cadet Radio Station

### Mission Support Activities

Big Brothers Club
Bluebards Dramatic Society
Cadet Aid to MIA Families
Cadet Chorale
Cadet Falconers
Drum and Bugle Corps
Icarus, Creative Writing Magazine
Photography Club
Saber Drill Team
USAFA Explorers
Yell Leaders

### Representative Competitive Activities

Competitive Flying Team
Bowling Club
Forensic Association
Handball Club
Judo Club
Karate Club
Model Engineering Club
Parachute Team
Rifle Drill Team
Rodeo Club
Rugby Football Club
Skeet Club
Soaring Club
Squash Club
Volleyball Club

### Professional Activities

American Institute of Aeronautics and Astronautics
Astronautics Club
Astronomy Club
Biology Club
Chemistry Club
Civil Engineering Society
Computer Science Club
Electronics Club
Foreign Language Club
Forum
Geography Club
History Club
Mechanics Club
Navigation Club
Physics Club
Psychology Club

### Recreational Activities

Amateur Radio Club
Archery Club
Aviation Club
Autosports Club
Badminton Club
Bicycle Club
CB Radio Club
Chess Club
Film Club
Fishing Club
Hunting Club
Military Science Club
Mountaineering Club
Racquetball Club
Saddle Club
Scuba Club
Ski Club
Weightlifting Club

### Committees and Councils

Cadet Professional Ethics Committee
Car Committee
Class Councils
Class Ring Committee
Entertainment Committee
Fourth Class Training Committee
Heritage Committee
Public Relations Committee
Wing Allied Arts Committee
Wing Rally Committee

## RECREATIONAL FACILITIES

Arnold Hall, the cadet social center, is a modern recreational complex which contains a variety of facilities. You and your guests may use these facilities when you have off-duty time. The 3,000-seat theater is used for movies, concerts, plays, special events, and appearances by nationally known entertainers, including contemporary stars who are popular among young people. Formal and informal cadet dances, receptions, and other social events are held in the large ballroom and two informal lounges. The center has a large snack bar which serves food on a nightly basis. A contemporary discotheque and live music are featured on weekends, and a giant-screen TV is included in the lounge entertainment. Also available in the center are game and recreation rooms, reading areas, and an eight-lane bowling facility.

Cadets are trained to develop social skills. Dance classes are offered regularly including many types of contemporary and classic ballroom dancing. Cadets must attend at least one formal ball each year where they experience the social requirements of a formal gathering. Each cadet receives a Cadet Decorum Handbook, which is a valuable adjunct to the social training.

The Academy provides outstanding cadet recreational facilities surrounded by the natural beauty of the mountains. You and your guests may use these facilities when you have free time. The closest of these facilities, Lawrence Paul Picnic Area, is located on a small lake within easy walking distance of the cadet area. It is used for

fishing, picnics and games. The Cadet Recreation Lodge nearby has a dining room, fireplace and dance floor. The Farish Memorial Recreation Area, situated on a lake in the mountains four miles west of the Academy, has accommodations for fishing, horseback riding, ice skating, boating and barbecues.

The Field House and Cadet Gymnasium are available to enjoy during your leisure time. Adjoining these facilities are many outdoor playing fields for various activities. The beautiful 36-hole Eisenhower Golf Course is available to all cadets.

When you are authorized to leave the Academy on weekends, you can take advantage of many attractions in the Colorado Rocky Mountain region. Some of the finest skiing, hunting and fishing in the world are available in the scenic areas of the mountains. The cities of Denver and Colorado Springs offer many athletic facilities and events, music and drama programs, museums and art centers.

## GRADUATION WEEK

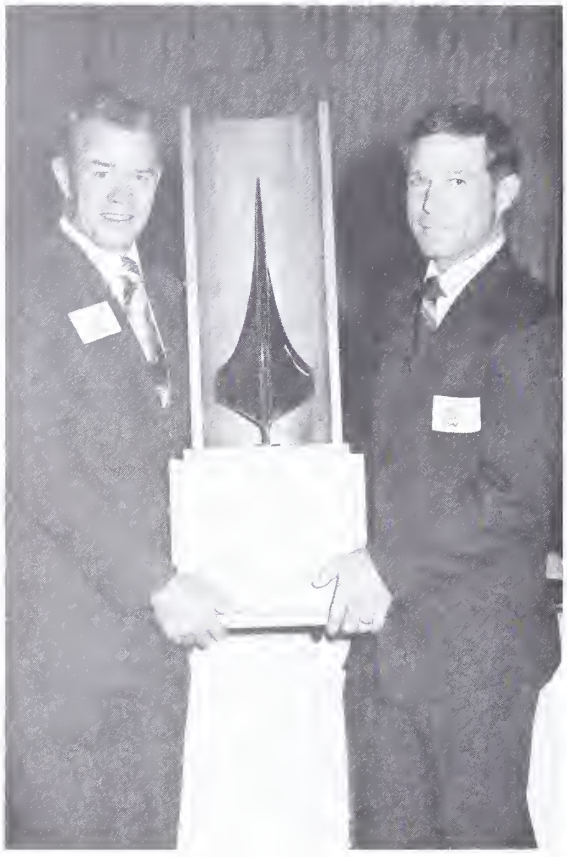
The final achievement of cadet life is the day of your graduation from the Air Force Academy. During the week prior to graduation, the Academy holds activities honoring your class with parades, social activities and special events. The week has special significance for members of all classes as they reflect on challenges just completed and look forward to new opportunities in the coming year.

Among the highlights of the week are four award ceremonies recognizing indivvidual cadets and units that have achieved scholastic, military and athletic honors. Organizations and citizens who have a vital interest in the Academy sponsor the trophies and awards


Graduation Week is climaxed by baccalaureate exercises, the graduation parade, and finally, the graduation exercises. Your family and friends, hopefully, will be present to see you graduate and to share your accomplishments with you. You will hear a distinguished guest speaker, receive your diploma for the Bachelor of Science degree, and take the oath of office for your commission in the Regular Air Force. The years you spent, which sometimes seemed long and difficult, may now appear short and memorable in retrospect.

Graduation will signify your completion of an extremely challenging task which tested your intellectual, physical, moral, and leadership abilities. Now that you have passed this supreme test, you are ready to serve your country and perform the duties of an officer for which you have been well prepared.


*Many women Academy graduates will follow the example of Major Connie Engle, who attended pilot training and became a T-38 instructor pilot.*



*Major Mart H. Bushnell, Class of 1964, right, received the 1979 Jabara Award for Airmanship from Lt General K. L. Tallman, Superintendent, during the homecoming award banquet.*

*During the 20-year reunion of the Academy's first graduating class, the Class of 1959 dedicated a plaque for the Class Wall, sponsored by the Association of Graduates.*

# AIR FORCE CAREER

WHEN you graduate from the Air Force Academy, you will receive a commission as a second lieutenant in the Regular component of the United States Air Force. Under the agreement which you signed upon entering the Academy, you will have an obligation to serve as an officer in the Regular Air Force for five years. If you enter Air Force flying training (pilot or navigator) when you graduate, you must serve for a longer period. Flying training lasts for approximately one year. If you complete pilot training, you must serve for six years after completion of the training. If you complete navigator training, you must serve for five years after completion of the training. A majority of Academy graduates have remained in the Air Force for a career.

An extensive career information and counseling program is conducted to assist you in making a reasonable choice of your initial assignment and in formulating tentative long-range plans for your career. Outstanding officers from major Air Force organizations, representing the broad range of Air Force skills, meet with you to discuss career opportunities, flying and technical training, graduate education, and personal aspects of service life. Individual counseling is provided by the Cadet Career Information Office, your Air Officer Commanding, the Cadet Counseling Center, and other professional sources among Academy faculty and staff. The career discussions are particularly emphasized during your first and second class years so that you will have factual, current information concerning the Regular Air Force which you will soon enter as a professional officer.

## Flying Career Assignments

Many Air Force Academy graduates initially pursue a flying career. You may broaden your career horizons through qualification in flying skills. Holding an aeronautical rating will enable you to qualify for important staff and command responsibilities which require a flying background.

If qualified to fly, cadets may enter flying training, either pilot or navigator, following graduation. Fixed-wing pilot and navigator training involves approximately one year of instruction at an Air Training Command base. Helicopter pilot training, limited to 25 graduates annually, is conducted by the Army. For cadets who plan to enter flying training, the Academy conducts both pilot and navigator indoctrination programs. These programs enable you to validate some of the basic courses in undergraduate flying training. After completing the undergraduate training and earning your wings, you will be scheduled for advanced training. Pilots and navigators may specialize in fighter, bomber or transport aircraft.

Following completion of flying training, you can expect to be assigned to a combat operational unit or mission support unit for several years. As Air Force requirements permit, you may then assume duties in another career area. Later in your career, you ordinarily will serve in challenging jobs relating to your flying specialty and those pertaining to another career area. However, the mission of the Air Force is to fly, and you must anticipate that a significant portion of your Air Force career will be in duties related to flying.

## Non-Flying Career Assignments

If you do not enter flying training, you will be assigned to one of several mission support career areas. For your initial assignment, you will be limited to important career areas in which Academy graduates are highly qualified to serve. Generally, these are the scientific, engineering, technical and combat support career areas.

The career areas designated for Academy graduates in each class will be subject to change annually, based on the needs of the Air Force. From among the career areas designated for your graduating class, you will be allowed to select an area for which you are academically qualified. After completing an assignment of three to five years in that specialty, you may volunteer for duty in any Air Force career area. Air Force requirements for personnel in that area, as well as your individual qualifications, will be considered in reviewing your application for reassignment.

There are over 80 major career areas which include many non-flying Air Force Specialty Codes (AFSCs). These career specialties embrace the broad spectrum of the sciences and engineering. Also included among the specialities are the fields of administration, management, finance, personnel, procurement, transportation, maintenance, supply, special investigations, psychology, cartography, human resources, health services, information, education, audiovisual, law, and medicine.

## Legal and Medical Training

Up to two percent of each Academy graduating class may be sent directly to medical school upon graduation. Training is completed under the Armed Forces Health Professions Scholarship Program or the Uniformed Services University of the Health Sciences. These two programs are also available to all active duty officers. Selection for these programs is on a competitive basis and the number of students will be based on the needs of the Air Force.

There is currently no provision for direct entry into law school upon graduation from the Academy. Congress has authorized the Air Force to enter 25 active duty officers into law school annually. An Academy graduate must complete two years of active duty before becoming eligible for consideration. Selection for law school sponsorship is on a competitive basis among all active duty officers who apply.

## Graduate Education

Cadets who have maintained outstanding grade averages may compete for distinguished graduate scholarships and fellowships. Included are the Rhodes Scholarships for advanced study at Oxford University, National Science Foundation Fellowships, National Collegiate Athletic Association Scholarships, Guggenheim Fellowships and other selected national competitions. Academy graduates who receive advanced education through one of these awards may elect flying training after completion of their graduate programs.

Graduates who ranked in the top 15 percent of their class in overall performance average who did not receive scholarships upon graduation may apply for graduate education after serving on active duty for approximately three years. These graduates are normally assured of selection for master's degree programs, provided they have performed well as officers and the Air Force has a need for the degree they wish to pursue. Most degree-granting programs are conducted at civilian universities through the Air Force Institute of Technology (AFIT).

Graduates who did not rank in the top 15 percent of their class may apply for advanced degree programs early in their careers. Selection of graduates and scheduled attendance will be based on the individual's qualifications and Air Force requirements. Selected officers will have their tuition and fees paid and receive pay and allowances.

## Career Benefits

Advancement in the Air Force is somewhat similar to advancement in a civilian occupation. It depends upon length of service, qualifications, and performance. The pay scale is established by Congressional law. The officer is paid according to rank and length of service.

As you progress in rank, your advancement will be based increasingly upon your personal merit and initiative. The Air Force is a vastly technological and far-reaching organization, yet one that recognizes the value of the individual. The Air Force puts a high premium on leaders with vision, dedication, and ability. It offers a stimulating challenge and an interesting future in a wide spectrum of fields to Academy graduates who employ their leadership talents.

Normally, you will be assigned during your career to one or more of the armed forces schools for advanced professional studies. These include the Air Force schools at Maxwell Air Force Base, Alabama (Squadron Officers School, Command and Staff College, and Air War College) and the Department of Defense schools (Armed Forces Staff College, Industrial College of the Armed Forces, and National War College) in the Washington D.C. area.

If you become a pilot or navigator, you will receive flight pay in addition to base pay. Both are taxed by the federal government. You will receive a tax-free allowance for subsistence, and an allowance for living quarters when not occupying government housing.

During your career you may have duty assignments both in the United States and overseas. Each time you move, you will obtain reimbursement for transportation costs, an extra allowance for incidental expenses of moving, and free shipment of household goods. On an average, an officer will move to a new assignment every three to five years.

Additional benefits which you receive are: medical and hospital expenses; commissary and base exchange privileges; officers club privileges; VA and FHA mortgage loan insurance; group life insurance; 30 days' paid vacation each year.

The government provides for retirement at no expense to the officer. You may retire at 20 years of service at 50% of base pay. Benefits increase proportionately to 75% of base pay at 30 years of service. You will contribute to Social Security and also receive those benefits when eligible.

A Regular officer in the armed services has excellent security prospects with stable

employment, pay, and benefits. The Academy is the Air Force's only program which provides a Regular commission upon graduation from the institution.

## Women in the Air Force

The contributions made by women in the armed forces are not new. Women have long served in the Nurse Corps of the various services. During World War II, women served in the air forces as part of the Women's Army Corps (WAC), the Army Air Forces, and Women Air Service Pilots (WASPS).

These contributions were recognized by Congress when it passed the Women's Armed Forces Integration Act in 1949. This act recognized women as a prominent part of the Armed Forces and created the Women in the Air Force (WAF) as a segment of the United States Air Force.

Under today's equal personnel concepts, women are not organized as a separate corps, or referred to as WAF, but form an integral part of the Air Force. They are trained and assigned under essentially the same policies as men, and they compete equally with men for promotions.

The Officer Training School (OTS) and the Air Force Reserve Officer Training Corps (AFROTC) have been open to women for several years. One of the final achievements of integrating women into Air Force training programs was made possible on October 7, 1975, when President Gerald R. Ford signed into law the bill which authorized admission of women to the national service academies. The law states that the standards required for admission, training, graduation, and commissioning of women will be the same as those required for men, except for minimum adjustments in standards due to physiological differences between men and women.

## Career Obligations

A career in the United States Air Force entails certain obligations as well as benefits. You are expected to serve your country with serious purpose and dedication. You may be assigned to various areas of the world considered vital to the maintenance of national or international security or important to the scientific and technological advancement of mankind. Some of the areas may be underdeveloped or remote where living conditions are below standards to which you have been accustomed. Your family may not be permitted to accompany you on certain assignments. Under all conditions you will be expected to give your best efforts and provide exemplary leadership for those under your command.

## Association of Graduates

An Association of Graduates has been established at the Air Force Academy to maintain contact with the alumni. The purposes of the Association are as follows:

- To promote interest and devotion to the Air Force Academy, its history, activities, and objectives;
- To encourage worthy young men and women to apply for appointment to the Air Force Academy;
- To foster fellowship among the graduates of the Air Force Academy in particular and among the United States armed forces officer corps in general;
- To provide for continued professional development of the armed forces officer corps in support of the military profession;
- To support other activities in the general interest of the Air Force Academy or the membership of the Association of Graduates.

The Association of Graduates maintains an Alumni Secretary within the Command Section of the Academy to create a central point of contact for all alumni matters. The Association is organized as a nonprofit body under the management of an elected Board of Directors, with necessary operating funds collected in the form of yearly dues as well as gifts, donations and bequests.

From 1955 through 1979, the Academy has graduated over 12,900 cadets.

# ACADEMY GRADUATE CAREER AREAS

## Class of 1980

Shown below are the career areas available to Academy graduates of the Class of 1980 for their initial assignments in the Air Force.

### Operations

Pilot
Navigator
+ Air Traffic Controller
Air Weapons Controller
Minuteman Missile Launch
Titan Missile Launch
+ Space Systems

### Communications-Electronics

Communications Systems
Communications Maintenance
Electronics Systems
Communications-Electronics Engineer

### Computer Technology

Computer Systems Development Officer
Computer Operations Officer
Computer Systems, Plans and Programs

### Comptroller

+ Cost Analysis
+ Management Analysis

### Civil Engineering

### Logistics

+ Fuels Management
Missile Maintenance
Aircraft Maintenance
Munitions Officer
+ Supply Operations
+ Acquisition Contracting
+ Production Manufacturing

### Intelligence

+ Signals Intelligence

### Security Police

### Scientific And Development Engineering

Physicist
Chemist
Scientific Analyst
+ Acquisition Project Officer
Electrical Engineer
Mechanical Engineer
Astronautical Engineer
Aeronautical Engineer
Project Engineer
+ Behavioral Scientist

+ Presently limited to a specified number from each class.

# AUTHORIZED STRENGTH
# of the
# Air Force Academy Cadet Wing

Congressional legislation provides for an authorized strength of 4,544 cadets. The authorized appointments at maximum strength for each nominating category are shown below. Cumulative appointments are the total number available, of which approximately one-third will enter each year. The other appointments are filled annually.

| SOURCE OF NOMINATION | Authorized Appointments (Cumulative) |
|---|---|
| 100 United States Senators (5 each) | 500 |
| 435 United States Representatives (5 each) | 2,175 |
| Vice President | 5 |
| District of Columbia | 5 |
| Puerto Rico | 6 |
| Panama Canal | 1 |
| American Samoa | 1 |
| Guam | 1 |
| Virgin Islands | 1 |
| Children of Deceased or Disabled Veterans and Children of Persons in a Missing Status | 65 |
| **Allied Students** | |
| Republic of the Philippines | 4 |
| American Republics | 20 |
| | **(Annual)** |
| Presidential | 100 |
| Regular Components | 85 |
| Reserve Components | 85 |
| Honor Military and Naval Schools, AFROTC and AFJROTC | 20 |
| Children of Medal of Honor Recipients | No Limit |
| Qualified Alternates | Number needed to fill the class |

# ADMISSIONS PROCEDURES

## DEFINITIONS OF TERMS

*Prospective Candidate* — An individual expressing an interest in attending the Air Force Academy.

*Precandidate*—An individual who submits a precandidate questionnaire to the Academy.

*Applicant*—An individual who applies to a Member of Congress or another nominating authority requesting a nomination.

*Nomination*—The result of naming an applicant as an Academy candidate by a nominating authority.

*Nominee*—An applicant who has obtained a nomination in a category authorized by law.

*Candidate*—A legally nominated individual whose name has been recorded by the Director of Cadet Admissions.

*Appointment*—An offer of admission to a fully qualified candidate.

*Appointee*—A qualified candidate who has been selected for admission.

*Cadet*—An appointee who has been admitted to the Academy and has taken the oath of allegiance.

## ADMISSIONS GUIDE

You should carefully read the admissions information in this chapter. The following is a summary of the steps for Academy applicants and candidates:

1. Check the eligibility requirements to see if you are eligible for a nomination.
2. During the spring of your junior year in high school, request a Precandidate Questionnaire from the Academy. Complete the questionnaire and return it to the Cadet Admissions Office.
3. Contact your Air Force Admissions Liaison Officer whose name may be obtained through your Liaison Officer Coordinator listed in this publication.
4. Apply to both of the U.S. Senators from your state and to the U.S. Representative from your Congressional district.
5. Study the criteria for the other nominating categories and apply if you are eligible.
6. Register for and take the Scholastic Aptitude Test (SAT) of the College Board Admissions Testing Program or the American College Testing Program (ACT).

## ELIGIBILITY REQUIREMENTS

You must meet the general eligibility requirements specified by public law, as follows:

*Age* — You must be at least 17 and not have passed your 22nd birthday on 1 July of the year to be admitted.

*Citizenship* — You must be a citizen of the United States. (Allied students authorized admission are exempt from the U.S. citizenship requirement.)

*Marital Status* — You must be unmarried, and have no dependent children. (Any cadet who marries will be discharged from the Academy.)

If you meet these requirements, then you may proceed to request a precandidate questionnaire and apply for a nomination. Before you apply, you should determine that you have a desire to become a cadet and have an interest in serving as an Air Force officer. You should carefully review the Preparation Guidance chapter to help you determine whether you are capable of competing on academic, medical and physical standards. This chapter outlines a high school program to assist you in meeting the desired standards.

## PRECANDIDATE PROGRAM

The Air Force Academy uses a precandidate program to evaluate the qualifications of prospective candidates. The submission of a precandidate questionnaire is the first step in the admissions process. The Academy will start an admissions file for you upon receipt of your completed precandidate questionnaire. You should request the questionnaire from the Academy during the spring semester of your junior year in high school, or as soon as possible thereafter, if you wish to enter the Academy immediately after graduation from high school. *Do not request the questionnaire prior to your junior year second semester.* Send your request to the Cadet Admissions Office, USAF Academy CO 80840.

Complete the questionnaire and return it to the Admissions Office as soon as the information can be provided. Based on an evaluation of your questionnaire, you will be advised by the Admissions Office of your potential for qualification. If the evaluation indicates that you meet the minimum standards for admission, you will be informed of your status and will be scheduled for a medical examination at a government facility. If you do not meet the minimum standards, you will be informed of the deficiency or deficiencies. You may submit additional test scores and/or information in an effort to meet the minimum criteria.

The results of precandidate evaluation are made available to Members of Congress to assist them in screening and identifying their nominees. Precandidate reports will be sent to Members of Congress the first week in October, November, December and January. Your completed questionnaire must be received at the Academy no later than December to insure inclusion in the final report. The Admissions Office uses the precandidate results to evaluate the qualifications of applicants in all nominating categories.

Participation in the precandidate program does not mean that you are under consideration for admission to the Academy. Before you can be considered, you must obtain a nomination in one of the nominating categories. It is advisable to apply for a nomination during the second semester of your junior year.

If you receive a nomination, normally you must have a completed precandidate questionnaire on file which indicates that you meet the minimum standards for admission before you will be permitted to continue processing. If the evaluation indicates that you do not meet the minimum standards, no action will be taken concerning your nomination until additional admission test scores and/or information are submitted which indicate that you might be able to meet the standards.

## ASSISTANCE TO APPLICANTS

The Academy provides counseling assistance to individuals who are interested in obtaining a nomination. The counseling is provided primarily by selected Air Force Reserve officers, not on active duty, who are located in all states. Some active duty and retired Air Force officers assist with the program. These officers are qualified to counsel you on all aspects of admission and many phases of cadet education and training.

The counselors are known as Air Force Admissions Liaison Officers (LOs). When you begin to plan and prepare for the Academy, you may want to contact the LO nearest to you. You may be able to obtan your LO's name and address from your high school guidance counselor. If it is not available, you may request this information by writing to the Liaison Officer Coordinator (LOC) in your area. A list of LOCs is included at the end of this chapter. If you become a qualified candidate, you will be required to see your LO whose name will be furnished to you by the Academy.

LOs also provide counseling for the Air Force Reserve Officer Training Corps (AFROTC). AFROTC sponsors several educational programs at colleges and universities.

## NOMINATING CATEGORIES

You must obtain a nomination in a category authorized by law before you can be considered for a cadet appointment. To increase your chances of being selected, you should request a nomination in all the categories in which you are eligible to apply. Your applications should be submitted during the year preceding admission according to the specific dates given under each nominating category. Sample application formats are included at the end of this chapter. They are to be used as a guide only. You should prepare your own letter of application based on the format.

The various nominating sources are explained as follows:

### Congressional Nominations

Any resident of one of the 50 states who meets the Academy eligiblity requirements may apply for a Congressional nomination. You must submit your request directly to a Member of Congress representing you. United States Senators nominate from their respective states at large. Representatives in Congress nominate from their districts. You may apply to both of the United States Senators in your state and to the Representative of your Congressional district. Refer to the Congressional application format at the end of this chapter.

*No political affiliation is necessary to apply for a nomination. Congressmen want to nominate outstanding individuals who will have a chance to qualify for an Air Force Academy appointment.*

Since many Congressmen conduct interviews and tests before selecting their nominees, they prefer early applications. It is advisable to apply approximately a year in advance of admission. Congressmen submit names of their nominees to the Academy any time between 1 May and 31 January for the class entering the following summer. A majority of them will make their selections early in this period. Application deadlines are established by the individual Members of Congress.

An applicant who is selected for nomination should receive a notice from the Congressman. The Admissions Office will send official notification of a nominee's candidacy after the Congressman has submitted the nomination to the Academy. A considerable period of time may occur between the applicant's request for nomination, the selection and notification of nominees by the Congressman, and the candidate notification from the Admissions Office.

Each Senator and Representative is authorized to have a maximum of five chargeable cadets attending the Academy at one time. For each cadet vacancy that occurs, the Congressman may nominate a maximum of ten candidates to be consid-

ered for the appointment. If the Congressman does not have a cadet vacancy available, candidates will not be nominated during that year. Three primary methods of nomination are available to Congressional members:

1. *Principal/Alternate*—The Congressman may nominate one principal candidate and nine alternates listed in the order of preference. If the principal candidate is determined to be fully qualified on Academy admissions criteria, he or she will be offered the appointment. If that person is disqualified, the appointment will be offered to the first designated alternate candidate who is qualified.
2. *Principal/Competitive Alternate*—The Congressman may nominate one principal candidate and nine alternates without designated preference. If the principal candidate is fully qualified, he or she will be offered the appointment. If that person is disqualified, the appointment will be offered to the alternate candidate who has the highest whole-person score.
3. *Competitive*—The Congressman submits the names of all candidates to the Academy for evaluation of their qualifications. The Academy ranks the candidates in order of their standing on all admissions criteria. The candidate who has the highest whole-person score will be offered the appointment.

## Other Nominating Authorities

The same methods of nomination available to Members of Congress may be used by the following nominating authorities:

*Vice President*—The Vice President of the United States nominates candidates from the nation at large. Applications must be submitted to that office no later than 31 October.*

*District of Columbia*—The Delegate in Congress from the District of Columbia nominates from among the residents of the District.*

*Panama Canal*—The Commission Administrator may nominate for Panama.

*Commonwealth of Puerto Rico*—The Resident Commissioner nominates from among all the residents of Puerto Rico, and the Governor nominates natives of Puerto Rico.*

*American Samoa, Guam, and the Virgin Islands*—Each is authorized to have one cadet enrolled at the Academy. When a vacancy exists, the Governor of Samoa or the Delegates in Congress from Guam and the Virgin Islands may nominate candidates.*

## Competitive Categories

Appointments in the following competitive categories are awarded to the best qualified candidates within each group in order of merit.

### Presidential

By law, vacancies allocated to the President of the United States have been reserved for children of career military personnel—enlisted, warrant, and commissioned—of the Air Force, Army, Navy, Marine Corps and Coast Guard (active, retired, or deceased). The child of a Regular or Reserve member of the armed forces is eligible if:

(1) the parent is on active duty (other than for training) and has served continuously on active duty at least eight years; or

(2) the parent was retired with pay or was granted retired or retainer pay (children of Reservists retired while *not* on active duty status are ineligible); or

(3) the parent died after retiring with pay or after being granted retired or retainer pay (children of deceased Reservists who were retired while *not* on active duty status are ineligible).

Persons eligible under the Children of Deceased or Disabled Veterans category may not be considered in the Presidential category.

*The above nominating authorities must submit the names of their nominees to the Academy by 31 January. The Congressional application format at the close of this chapter may apply as a guide. Send the Vice Presidential application to: Vice President, United States Senate, Washington, DC 20510. Send other applications to the appropriate nominating authorities.

In order for an adopted child to qualify as a Presidential candidate, he or she must have been legally adopted before the fifteenth birthday or proceedings must have been started before that time. Adoption proof should be submitted with application.

To request a nomination in this category, the individual (not a parent) must submit an application to the Cadet Admissions Office between 1 May and 31 January.* Please do not apply directly to the President of the United States.

**Children of Deceased or Disabled Veterans; Children of Military or Civilian Personnel in a Missing Status**

The child of a deceased or disabled member of the armed forces is eligible if:

(1) the parent was killed in action or died of wounds or injuries received or diseases contracted in active service, or died from preexisting injury or diseases aggravated by active service; or

(2) the parent has a service-connected disability rated at not less than 100 percent resulting from wounds or injuries received or diseases contracted in active service, or resulting from preexisting injury or disease aggravated by active service.

The child of a parent who is in "Missing Status" is eligible if:

the parent is a member of the armed services or a civilian employee in active government service who is officially carried or determined to be absent in a status of missing; missing in action; interred in a foreign country; captured, beleaguered, or besieged by a hostile force; or detained in a foreign country against his will.

To request a nomination in this category, an individual must submit an application to the Cadet Admissions Office between 1 May and 31 January.*

**Regular Components and Reserve Components**

Vacancies are available for enlisted members of Air Force Regular and Reserve components. Included in this category are Air Force Regular airmen on active duty and airmen serving in the Air Force Reserve and the Air National Guard.

AFR 53-10, "Appointment to the United States Air Force Academy" gives complete directions for applying in the Regular and Reserve categories. A prospective candidate must apply through the unit commander, who will process the application and forward it to the Director of Cadet Admissions for a determination or eligibility. The application form (AF Form 1786) should be obtained through normal publications supply channels at the military organization where the individual is assigned. Applications for both Regular and Reserve components must be submitted not later than 31 January.

**Honor Military and Naval Schools**

Vacancies are authorized for honor graduates of honor military and naval schools. The Departments of Air Force, Army, and Navy determine annually which schools will be designated as honor schools. Each school may nominate five candidates from its honor graduates or prospective honor graduates to compete for the cadet vacancies. Each nomination must contain a certification by the head of the institution that the candidate was an honor graduate or is a prospective honor graduate during a year that the institution was designated an honor school. Application forms are provided by the Academy to eligible schools. Nominations must be submitted to the Cadet Admissions Office by 31 January.

**Air Force Reserve Officer Training Corps**

Five students from each college or university AFROTC unit may be nominated to compete for the authorized vacancies. Students should apply to the Professor of Aerospace Studies who must certify that they meet the basic eligibility requirements. The Professor of Aerospace Studies will recommend to the president of the institution the best qualified applicants. The president will submit the nominations on a form provided by the Academy indicating his

*Refer to the Service-Connected nomination format at the end of this chapter.

concurrence and the satisfactory academic standing of the nominees. The form must be sent to the Cadet Admissions Office by 31 January.

#### Air Force Junior Reserve Officer Training Corps

Five students from each eligible high school may be nominated to compete for the authorized vacancies. Students should apply to the Aerospace Education Instructor who must certify that they meet the basic eligibility requirements and by the end of the school year will have successfully completed the prescribed AFJROTC program and be awarded a certificate of completion and a high school diploma. The Aerospace Education Instructor will recommend to the principal of the high school the best qualified applicants. The principal will submit the nominations on a form provided by the Academy indicating his concurrence. The form must be sent to the Cadet Admissions Office by 31 January.

## Children of Medal of Honor Recipients

The children of Medal of Honor recipients who served in any branch of the armed services may apply for a nomination in this category. If applicants meet the eligibility criteria and qualify on the entrance examinations, they will be appointed to the Academy. Vacancies are not limited in this category. Applicants must write to the Cadet Admissions Office between 1 May and 31 January.

## Qualified Alternate Candidates

Qualified candidates who are not selected to fill the specific vacancies for which they were nominated will be considered for appointments in sufficient numbers to bring the entering class to the desired size. Selections will be made on a competitive basis. No special application by the individual is necessary since qualified candidates in all nominating categories will be considered. Congressional nominees selected as qualified alternate appointees are not counted against a Congressman's chargeable cadet quota.

## Allied Students

The Air Force Academy may provide instruction to young persons from allied countries as follows:

#### Republic of the Philippines

One student from the Philippines may be admitted to the Academy each year. The President of the Republic of the Philippines will be responsible for selecting nominees to be considered for this appointment.

#### American Republics

As many as 20 citizens from American Republics may be enrolled at the Academy at one time. Not more than three persons from any country in the American Republics may be enrolled at the same time.

To request a nomination, an applicant should write to an appropriate official of his/her government, not to the Academy or other United States government officials. The letter should contain information about the applicant's background and should be submitted at least a year prior to admission.

Nominations should be received in the Admissions Office by 31 December for the class entering the following summer, but they should be submitted as early as possible.

Requirements for admission are essentially the same for allied students as for United States cadets. Either the College Board Admissions Testing Program or the American College Testing Program is required for allied students. Nominees who do not speak English as their primary language must take the English Comprehension Level Test.

Students selected for the Academy must be able to read, write, and speak English proficiently. English language instruction will be provided for them during basic cadet training and the fourth class year. Semester schedules and curricular requirements may be adjusted by the office of the Dean of Faculty to allow for specific language and cultural differences.

Allied students receive the same pay and allowances as United States cadets. However, the allowance for initial travel to

the Academy is not limited to mileage for travel within the United States.

If an allied student should be judged unable to profit by the academic courses, become deficient in conduct or military aptitude, or commit an offense for which a United States cadet would be dismissed, the Department of the Air Force will be requested to withdraw the student from the Air Force Academy.

Each student who meets the established academic requirements for allied students will be awarded a Bachelor of Science degree. A student who does not meet the degree requirements will be awarded a Certificate of Completion. Allied students are not commissioned in the United States Air Force.

### Previous Candidates

If you applied for the Air Force Academy in a previous year, and failed to receive an appointment, you may become a candidate again if you are successful in obtaining a new nomination. You should request a precandidate questionnaire by writing to the Cadet Admissions Office, USAF Academy CO 80840. The new questionnaire will enable you to submit current scholastic test scores and update your extracurricular activities. Reports on the questionnaires are provided to Members of Congress.

## REQUIRED EXAMINATIONS

### Medical Examination

The required medical examination measures physical and mental fitness for the strenuous cadet program. The examination also measures the medical qualification for Air Force flying training. A majority of the candidates admitted must possess the qualifications for pilot or navigator flight training. The remaining candidates must meet medical standards for a commission. The medical standards and examination requirements are listed at the end of this chapter. You should review this information thoroughly.

Medical examinations for all service academies are scheduled by the Department of Defense Medical Examination Review Board (DODMERB). A medical examination normally will be authorized only if an evaluation of your precandidate questionnaire indicates that you meet the minimum qualifications for admission. Examining facilities will not conduct an examination unless the applicant has been scheduled.

You will be notified by letter as to the date, time and place of your examination. If possible you will be scheduled at a government medical facility near your home. You should make every effort to meet the scheduled date. If unable to be present on that date, you must notify the Medical Examination Review Board and the medical examining facility.

The report of your medical examination will be forwarded to the Medical Examination Review Board for evaluation and certification. You will be notified of your medical qualification status. If you have met all medical standards, you will be fully qualified. If you are found disqualified for a nonremedial condition, no further testing will be authorized. If you have a remedial condition, you will be advised of the corrective measures required before a reexamination is scheduled. The medical examination will be honored by all U.S. service academies and ROTC programs. Therefore, a candidate will be scheduled for only one examination.

Any questions concerning a candidate's medical qualification must be referred to the Director of Air Force Standards, DODMERB, USAF Academy CO 80840.

### Scholastic Tests

All candidates for admission to the Air Force Academy should take either the College Board Admissions Testing Program (ATP) or the American College Testing Program (ACT). If you choose the College Board ATP, you will be required to take the Scholastic Aptitude Test (SAT) consisting of a verbal section and a mathematics section. You are encouraged, but not required, to take the College Board Achievement Tests. If you choose the American College Testing Program, you must take the entire

ACT battery consisting of four tests: English, mathematics, social studies and natural sciences.

The tests are offered on several dates during the fall and winter months. You may take the tests any time they are offered but not later than February of the year you desire admission to the Academy. Scores for tests taken after February will not be received by the Academy in time for you to be considered for an appointment when regular selections are made in April. It is advisable to register for the tests even if you have not yet received an Academy nomination. This will eliminate risk of being unable to register if you should receive a nomination after the closing date for test registration. It is also desirable to take the tests prior to the February date so you can retake them in an effort to improve your scores.

It will be your responsibility to register for the tests approximately four weeks in advance each time you wish to take them. Most high school counselors will have the scheduled testing dates and instruction booklets published by the College Board Admissions Testing Program and the American College Testing Program. The booklets will contain descriptive information on the tests and registration instructions. Mail your test registration and test fee to the appropriate testing program office. You will be scheduled to take the tests at the exam center you have chosen if the quotas have not been filled. Otherwise, you will be scheduled at another center as close as possible to your home. When you register for the tests, you must request that your scores be sent to the Air Force Academy.

If your guidance counselor does not have complete information on the ATP or ACT tests, you may write directly to the respective offices.

Write to the College Entrance Examination Board office, either at Box 592, Princeton, N.J. 08540, or Box 1025, Berkeley, CA 94701. (Candidates who live in Montana, Wyoming, Colorado, Arkansas, Texas and states west should write to the California office; others should write to the New Jersey office.)

Write to the Registration Department, American College Testing Program, Box 414, Iowa City, Iowa 52240.

You may compare your test scores with the average scores of candidates appointed to the Academy in a recent class by referring to the following table:

| ATP | *Minimum* | *Mean* | *Maximum* |
|---|---|---|---|
| Verbal Aptitude | 450 | 568 | 800 |
| Math Aptitude | 500 | 656 | 800 |
| ACT | | | |
| English | 19 | 23.4 | 36 |
| Social Studies | 21 | 26.0 | 36 |
| Mathematics | 23 | 29.6 | 36 |
| Natural Sciences | 22 | 29.9 | 36 |

You may benefit by taking one or both of these testing programs in your high school junior year. Then if you become an Academy candidate you may improve on previous scores by retaking the tests in your senior year.

## Physical Aptitude Examination

The Physical Aptitude Examination (PAE) consists of four exercises designed to measure coordination, strength, endurance, speed, and agility. You will be scheduled for a PAE only if an evaluation of your precandidate questionnaire indicates that you meet the minimum qualifications for admission. You will be scheduled to take the PAE at an examining center as close as possible to your home. Test items are shown at the end of the chapter. You should be in good physical condition before taking the test. Failure to attain a satisfactory score is disqualifying for admission, but candidates who fail may arrange to retake the test.

The same Physical Aptitude Examination will be honored by both the Air Force Academy and the Military Academy. A candidate applying for both service academies will need to take the PAE only once. If the exam is administered by the Military Academy, it is the candidate's responsibil-

ity to have the results forwarded to the Cadet Admissions Office, USAF Academy CO 80840.

## SELECTION SCHEDULE

Qualified candidates who hold principal nominations, as well as other highly qualified candidates, may be notified of their appointments as soon as they meet all entrance requirements. Early notifications will begin in November and continue through March. However, If your records are not complete, it will not be possible for Academy officials to consider you for an early appointment.

After the Academy receives the results of your tests, your qualifications will be evaluated and you will be notified of your status. If notified that you are below the admissions criteria, the deficiency/deficiencies will be explained. You may retake the tests or take other necessary action to improve your status so long as you can provide the Academy with the required information by 1 April.

Candidates who have not received early appointments will be considered in April if their records are complete and they are fully qualified. A complete record includes all correspondence concerning a candidate and the following documents: results of required examinations (SAT or ACT, PAE and medical exam); candidate activities' record; high school transcript; preparatory school and/or college transcript, when appropriate; school officials' evaluation and letters of recommendation, when available; Admissions Liaison Officer evaluation; drug abuse record; and candidate personal data record.

A candidate whose medical status has not been determined by 1 April will be considered for a conditional appointment. If the candidate is selected, the appointment would depend upon a determination of medical qualification.

Early in April candidate evaluation panels, comprised of senior officers assigned to the Academy, consider the qualifications of each candidate who did not receive an early appointment. The panels consider the candidate's qualifications based on information contained in his or her records. The evaluation is based primarily on academic and leadership potential, as well as any indication of motivation and aptitude for the Academy which may be available in the candidate's records. The panels list candidates in order of merit according to their selection composite, called "whole-person" scores.

The Academy Board, composed of the Superintendent and his staff officers, individually considers each candidate who has received a qualifying whole-person score. The board recommends candidates to fill the available cadet vacancies in each nominating category. The appointment recommendations are subject to final approval of the Secretary of the Air Force. All candidates will be notified of their qualification status no later than May.

If your records are not complete by 1 April, you will be considered for an appointment at a later date only if a vacancy should occur and you are found qualified for admission. Since some initial appointees may decline their appointment offers, other qualified candidates will be selected to fill those vacancies. In such cases, the replacement candidates may not be notified of appointments until shortly before the class enters late in June.

## APPOINTEE REQUIREMENTS

### Documentary Requirements

*Social Security Number*

If you do not have a social security number, you should apply for one prior to admission. The application form may be obtained from the local Post Office or the Social Security Administration Office. Ask for Treasury Department Form SS-5.

*Transcripts and Activities Record*

You will be required to submit your entire scholastic record in secondary school and in preparatory school or college if you have attended. High school students are requested to submit their current rank in class. You will be required to submit an

activities record outlining your high school extracurricular performance or other activities which indicate leadership potential.

*Birth Certificate or Proof of Citizenship*

You must submit proof of citizenship if you were foreign born or naturalized. U.S. citizenship is required unless you are applying as an allied student. A candidate who is adopted, claiming eligibility in a nominating category through an adoptive parent, must submit a copy of the court order of adoption.

## Admission Deposit

Each appointee will be requested to deposit $300 at the time of entry to the Academy. The deposit will be collected during initial processing. The amount will be credited to your cadet pay account and will be used to help defray the cost of uniforms and other personal expenses that will be incurred immediately upon admission. The deposit should be made in the form of a cashier's check or money order, with your name on it, made payable to the Accounting and Finance Officer, USAF Academy, CO 80840.

In a case of extreme hardship, this deposit may be reduced. A request for waiver should contain full justification. An appointee who is unable to make a full deposit will receive reduced money allowances until the account reaches the level as prescribed for the class.

The $300 entrance deposit is supplemented by authorization of the Secretary of the Air Force to advance a maximum of $900 to each cadet upon admission to the Academy. This advance becomes an extension of credit when your cumulative earnings are exceeded by your cumulative indebtedness and will be extended only for the purchase of initial clothing and equipment. The advance must be repaid during the time you are in training. The repayment is accomplished by recouping from the portion of your monthly pay not required for books, clothing, income tax, social security and other required items of expense. Recoupment continues until the advance is repaid.

Cadets who are involuntarily separated from the Academy prior to repayment of the advance will have all excess pay and allowances applied against the indebtedness. If the indebtedness is not satisfied by such application of funds, the cadets are permitted to turn in enough clothing and equipment of a distinctive military nature to liquidate the remaining balance. Cadets who are voluntarily separated for their own convenience will be afforded the opportunity to turn in, for monetary credit, certain uniform and equipment items that are unused and unaltered. Cadets who are voluntarily separated are required to satisfy any indebtedness that remains after such monetary credit is extended.

## Travel Expenses

Appointees will receive instructions concerning fiscal allowances for travel to the Academy. Travel allowances will be credited to your personal checking account. Appointees who refuse to take the Oath of Allegiance upon arrival at the Academy, or appointees who are disqualified from accepting the oath because of some fault of their own, will not be entitled to any travel allowances.

# SERVICE OBLIGATIONS

The service obligations apply to all cadets except allied students from foreign nations.

*Oath of Allegiance*—When you process into the Academy, you will be asked to take the following Oath of Allegiance:

> "I, _____ *(name)*, having been appointed an Air Force cadet in the United States Air Force, do solemnly swear (or affirm) that I will support and defend the Constitution of the United States against all enemies, foreign and domestic; that I will bear true faith and allegiance to the same; that I take this obligation freely, without any mental reservation or purpose of evasion; and that I will well and faithfully discharge the duties of the office on which I am about to enter. So Help Me God."

*Service Agreement:* After you have taken the oath, you will be required to sign an agreement, with the consent of your parents or guardian if you are a minor, that you will fulfill the following service obligations:

- Complete the course of instruction at the Academy (unless you are disenrolled by competent authority).
- Accept an appointment and serve as a commissioned officer in the Regular Air Force for five years after graduation.
- If authorized to resign from the Regular component before the sixth anniversary of your graduation, serve as an officer in the Reserve component until the sixth anniversary.

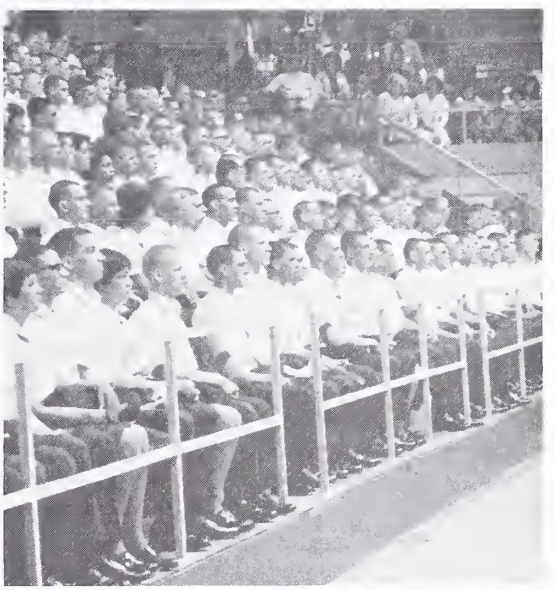
*Service Understanding:* You will be required to sign a Statement of Understanding which involves the following conditions set forth in Title 10 of the U.S. Code:

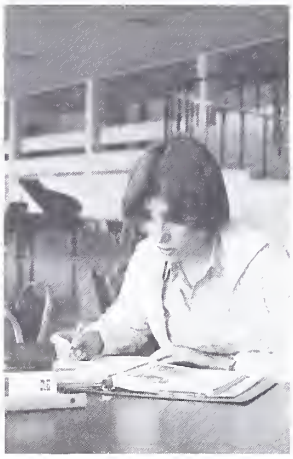
- A cadet who enters the Academy from the Regular or Reserve component of any service, if discharged from the Academy prior to graduation, will normally revert to former rank and branch of service for the completion of any prior service obligations.
- A cadet who enters the Academy from civilian life will assume a six-year legal obligation to serve in the Air Force, either active or reserve. If discharged from the Academy prior to graduation, the person will be subject to current Air Force policy.

*Discharge Policy:* The policy requiring discharged cadets to serve in the Air Force may vary, depending on manpower needs of the Department of Defense. The current Air Force policy is as follows:

- Fourth and Third Class cadets who are separated by the Academy or whose resignations are accepted will ordinarily be completely relieved from all military duty, active or reserve.
- Effective with the Class of 1982, Second Class cadets who are separated by the Academy or whose resignations are accepted will normally be transferred in enlisted status to an inactive reserve component for the remainder of their six-year service obligation.
- First Class cadets who are separated by the Academy or whose resignations are accepted will incur an active duty service commitment (except for those separated for physical disability or unsuitability for further service). They will normally be transferred to the Air Force Reserve and ordered to active duty in enlisted airman status. Specifically, First Class cadets who resign on or after the first day of academics in the fall semester but before completion of the academic program in the spring semester will incur a three-year active duty service commitment. First Class cadets who complete the entire academic program and resign or refuse to accept a commission may be ordered to active duty for four years.
- All cadets entering the Academy with prior military service of any kind, upon separation from cadet status, will normally revert to the former rank and branch of service for completion of the remaining period of obligated service.

*Resignation Policy:* A cadet who submits a request to resign will be required to state a specific reason for the action. Appropriate procedures will be established for a determination of each case by the Academy Board, composed of the Superintendent and designated senior officers of the Academy.





# PREPARATION GUIDANCE

IT is important to start preparing for the Academy well in advance of admission. Academic, leadership, and physical preparation may even begin on the junior high school level. In senior high, you should definitely follow the program of preparation outlined in this chapter.

High school counselors and Air Force Admissions Liaison Officers may provide helpful assistance to students who are preparing and applying for the Academy. One of the most important things for you to know is *when* to apply. If you want to enter immediately after graduation from high school, as most cadets do, you must apply well in advance. It is advisable to apply for a Congressional nomination during the spring of your junior year. Members of Congress may submit their nominations from May through January for the cadet class entering the following summer. Since most Congressmen nominate their candidates well in advance of the 31 January deadline set for submitting nominations to the Academy, individuals who apply early usually stand a better chance of receiving a nomination.

Senators and Representatives are interested in nominating the student who has excelled academically in high school, who has demonstrated leadership potential through school activities, who is physically fit, who is liked and respected by associates, and who has a desire to pursue a military career.

Students not successful in obtaining an appointment to enter following high school graduation may try for the Academy class entering the following year. The Academy encourages unsuccessful candidates to attend a preparatory school or a civilian college or university during the intervening year. Any accredited institution of higher education which offers a broad curriculum in the sciences, social sciences, and humanities should provide adequate preparation.

## Academic Preparation

An Academy candidate is required to take either the College Board Scholastic Aptitude Test (SAT) or the American College Testing Program (ACT). These tests measure potential for success in the cadet academic program of the Academy. You are advised to take one or both of these testing programs in your high school junior year. If your scores are low in certain areas, you will have time to improve through further counseling and study. When you retake the tests as a candidate in your senior year, your scores may show considerable improvement. If your scores are high when you take the tests as a junior, you will not be required to retake the tests, although you may do so if you choose.

At the beginning of your junior year, you should obtain the SAT and/or ACT testing dates through your school counselor. It is your responsibility to register for the tests. The College Board administers a Preliminary Scholastic Aptitude Test (PSAT) in October each year. It is recommended that you take this test since it provides excellent preparation and experience for the SAT tests.

To obtain the proper background for the SAT or ACT tests, and for the academic program at the Academy, you should definitely take the following subjects in high school and strive for above average grades:

*English:* Four years, including literature, composition, grammar, communication, and reading skills. A college preparatory course in written composition during your junior or senior year is especially recommended.

*Mathematics:* Four years, including algebra, geometry, trigonometry, and college preparatory mathematics.

*Basic Sciences:* Standard courses in physics and chemistry to include laboratory work. Additional courses in the sciences are desirable.

*Social Sciences:* A standard course in American History. Additional courses in history, economics, government, and geography are helpful.

A course in typing is recommended since cadets have many reports and themes to prepare. Typewriters are available to cadets.

Each cadet is required to take one foreign language, either Arabic, German, Chinese, Japanese, Spanish, French, or Russian. A high school background in one of these languages is helpful. The student who has an opportunity to take a language in high school should select one language and take as much instruction in it as possible. Two or three years of instruction are considered desirable. Either Russian or German is appropriate for cadets who may desire to major in the sciences.

The Academy does not require specific school courses or credits for admission. A candidate does not have to be a high school graduate to gain admittance. However, anyone who has not graduated from high school at the time of entering may lack the proper background to accomplish the program of education. You should try to achieve the highest possible grades in your high school courses. Approximately 90 percent of the cadets have ranked in the top quarter of their graduating classes. Candidates who have ranked below the top 40 percent of their graduating classes normally do not receive an appointment and should obtain additional academic preparation if interested in reapplying.

College credits may be transferred to the Academy if the courses correspond to those in the cadet curriculum and an acceptable grade level has been achieved. Cadets who have successfully completed college level high school courses, or those who have acquired extensive knowledge of a subject without taking a course, may take validation examinations after admission in an effort to obtain credit for comparable Academy prescribed courses. Placement/validation examinations are administered to each new cadet in the following subjects: English, history, geography, chemistry, biology, mathematics, political science, and foreign language.

Cadets who have made high scores on College Board Advanced Placement tests

may receive validation credit for comparable Academy courses. If you have taken advanced placement courses in high school you are advised to take the related advanced placement tests. These tests are administered in May of each year at College Board examining centers throughout the country. Registration in advance, including payment of fee, is necessary. Information on registration procedures, fees, testing dates, and examining centers is contained in the bulletin, *Advanced Placement Examinations*, available without charge. This bulletin may be obtained by writing to the College Board Advanced Placement Examinations at one of the following addresses: Box 592, Princeton, N.J. 08540, or Box 1025, Berkeley, CA 94701.

A cadet who demonstrates acceptable achievement in a subject through college transfer credit or validation examination will be allowed to complete the comparable Academy course at an accelerated rate or to omit the course and take an appropriate substitute. No matter how many courses cadets may validate or transfer, they must enter in the fourth class and spend four years at the Academy.

Students preparing for the Academy should plan to transfer credit or validate courses whenever possible. Cadets who have done so will be able to complete prescribed courses sooner, thus leaving more time in their schedule to gain depth in a subject area or prepare for post graduate study. Many Academy graduates will have opportunities for advanced study at civilian universities or Air Force schools during their military careers.

You should learn how to study effectively and budget your time to an advantage, for this is expected of every cadet at the Academy. To be successful, a cadet must give maximum effort to the curriculum of academic studies, military instruction, and physical education.

## Leadership Preparation

All phases of the Academy curriculum are devoted to preparing the cadet for leadership in the Air Force. Active participation in high school extracurricular activities provides valuable experience in preparing for positions of leadership responsibility. You should participate in extracurricular activities, both athletic and non-athletic. Examples of activities considered as evidence of leadership potential are:

1. Class officers or student government.
2. Participation and achievement in athletics (football, baseball, basketball, track and other sports).
3. Cheerleader or drill team.
4. Meritorious awards in academic or leadership activities (Citizenship Award, Boys' or Girls' State or Nation, National Honor Society).
5. Participation and achievement in public speaking, debate, dramatics, publications, musical activities, and clubs.
6. Participation and achievement in the Scouts, Civil Air Patrol, or Reserve Officer Training Corps.

Consideration is given to candidates who are prevented from extracurricular participation due to work requirements for family assistance.

## Physical Preparation

Physical fitness is essential if a cadet is to succeed at the Academy. Many studies have shown that there is a definite correlation between physical fitness and the ability to succeed in the programs of education and training.

A Physical Aptitude Examination (PAE) is given to candidates to measure their coordination, strength, endurance, and agility. You should prepare for this examination by engaging regularly in vigorous physical activity such as running, exercises, and sports, as well as practicing the specific skills of the PAE.

You should attempt to be in the best physical condition possible when you arrive for admission to the Academy. This will involve taking proper care of your health and building up your physical strength and endurance. Your first two months at the Academy will be devoted to a strenuous program of Basic Cadet Training.

Physical exertion is required from morning until night as you go through the summer program. To be properly conditioned for the physical demands that will be placed upon you, it is strongly recommended that you prepare in advance through the following athletic activities:

1. Participate in vigorous competitive team sports such as baseball, basketball, football, and track.
2. Participate in individual sports requiring sustained physical effort such as swimming, tennis, handball, squash, boxing, judo, and wrestling.
3. Perform strenuous conditioning exercises until many repetitions of each exercise can be accomplished without undue physical strain. Push-ups, pull-ups, sit-ups, and other exercises which emphasize upper body strength and endurance are recommended.
4. Perform distance running regularly. Two-mile runs are recommended with alternate running and walking at first and gradually increasing the amount of running.
5. Learn to swim well to prepare for the aquatics portion of physical education. A distance of 500 feet in five minutes should be a minimum goal. Practice basic swimming skills: floating, front crawl, and side stroke.

## PREPARATORY SCHOLARSHIPS

Three non-profit agencies, the Falcon Foundation, the Gertrude Skelly Trust, and the General Henry H. Arnold Educational Fund, provide educational assistance programs to enable deserving candidates to better qualify for admission to the Air Force Academy. These agencies have no official connection with the United States Air Force or the Air Force Academy. Neither do they have any connection with the Air Force Academy Foundation which raises funds to provide recreational and cultural facilities for the Academy.

### The Falcon Foundation

The Falcon Foundation provides preparatory scholarships annually for highly motivated and qualified candidates seeking admission to the Academy and a career in the Air Force. The scholarships are awarded through preparatory schools to students who need additional academic preparation.

The Foundation makes annual cash grants for these scholarships to specific preparatory schools in various parts of the nation. Application for scholarships and information concerning the schools should be made directly to the Falcon Foundation, Post Office Box 67606, Los Angeles, CA 90067. Completed applications must be received by the Falcon Foundation by 1 May each year.

### The Gertrude Skelly Trust

The late Gertrude Skelly of Tulsa, Oklahoma, established this trust fund. Scholarships from the fund will be awarded only to children, adopted children, or stepchildren of active, retired, or deceased career members of the armed forces of the United States. A person should not apply unless a parent was or is a career member of the armed forces. Complete information on applications may be obtained by writing to The Gertrude Skelly Trust Fund, Post Office Box 1349, Tulsa, OK 74101. Completed applications must be received by 1 May each year.

### The General Henry H. Arnold Educational Fund

Sponsored by the Air Force Aid Society, this fund provides educational assistance to children of Air Force personnel. Assistance is limited to college and preparatory schools beyond the high school level. Applicants may make their own choice of an accredited school. An application blank may be requested from: Director, Air Force Aid Society, National Headquarters, Washington, D.C. 20333. An application blank is not available at Aid Society sections on Air Force installations. The completed application, including qualifications and need for financial assistance, must be returned to the Air Force Aid Society not later than 31 January preceding the fall of the year the applicant plans to enter a civilian college or preparatory school.

# THE ACADEMY PREPARATORY SCHOOL

The Air Force Academy conducts a Preparatory School located approximately five miles south of the Cadet Area. The school is a self-contained complex including classrooms, dormitories, a dining hall, gymnasium, athletic fields, and a parade ground.

Prep School instruction is divided into five areas: English, mathematics, chemistry, military training, and physical training. A class of approximately 250 students enters in July and completes the instruction the following May. Prep School graduates selected for cadet appointments enter the Academy late in June.

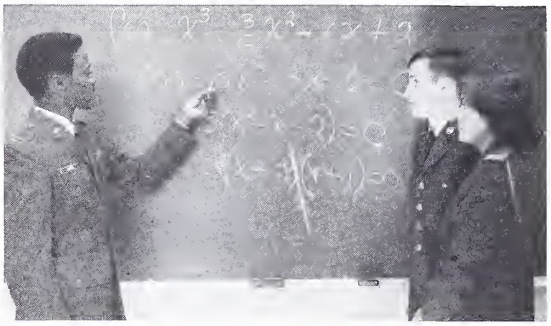
A portion of the Prep School class is composed of eligible Air Force enlisted men and women. Other vacancies in the class are filled by selected men and women candidates who were not offered appointments to the Air Force Academy. Students must be at least 17 and not over 21 years old as of 1 July of the year they enter Prep School.

**Military Personnel:** Appointments to the Air Force Academy are available each year for enlisted members of the Air Force Regular and Reserve components. Included in this category are Air Force Regular airmen on active duty and airmen serving in the Air Force Reserve and the Air National Guard.

Air Force personnel who want to attend the Preparatory School prior to entering the Academy may apply under AFR 53-14 "Air Force Academy Preparatory School." AF Form 1786 is the application form for requesting both a nomination to the Academy and an appointment to Prep School. You must fill out this form and submit it to your unit commander, who will forward the form along with a statement of recommendation to the Academy. All applications must reach the Cadet Admissions Office at the Academy prior to 1 May.

Members of the Army, Navy, and Marine Corps are not eligible to apply for an Academy nomination under the Air Force Regular and Reserve categories. Members of these services who want to enter the Air Force Academy may apply for a nomination from a Member of Congress. If a nomination is obtained from a Congressman or other authorized nomination source, enlisted personnel will then be eligible to be considered for the Academy Prep School.

Consideration for Prep School is based on your high school academic record, extracurricular activities, military performance, and the results of Academy examinations.



**Civilian Candidates:** Academy candidates who are not offered cadet appointments will be considered for selection to the Prep School. Candidates selected are those whose records indicate that they have the potential for the Academy, but need additional academic preparation to improve their chances for admission. Candidates who have attended college or another preparatory school are not eligible.

It is not necessary for Academy candidates to initiate applications for the Prep School. The records of each candidate not selected for an Academy appointment will automatically be reviewed. Candidates selected for a Prep School appointment will be notified from April through June.

Selection for the Prep School, or completion of the course, does not guarantee you an appointment to the Academy. You must meet the same minimum qualifying standards as other candidates.

High school students should not request admission to the Prep School prior to making application for the Academy. Prep School nominees will require an Academy nomination.

# Format of Request for Congressional Nomination

(This format is intended as a guide. A separate letter must be sent to each Senator and Representative to whom you apply.)

Date_____

The Honorable_____
House of Representatives
Washington, D.C. 20515

Dear Mr. _____:

OR

The Honorable_____
United States Senate
Washington, D.C. 20510

Dear Senator _____:

It is my desire to attend the Air Force Academy and to serve in the United States Air Force. I respectfully request that I be considered as one of your nominees for the class that enters the Academy in June 1981 and submit the following data:

Name *(print as recorded on birth certificate)*:_____

Social security number: _____

Permanent address *(street, city, county, state, zip code)*:_____

_____

Temporary address (if applicable):_____

_____

Permanent phone number and area code: _____

Temporary phone number and area code (if applicable): _____

Name of father: _____ Name of mother: _____

Date and place of birth *(spell out month)*: _____

_____

Name and address of high school: _____

Date of graduation: _____ Approximate grade average: _____

Furnish scores if you have taken tests:

| PSAT | ATP (SAT) | ACT |
|---|---|---|
| Verbal _____ | Verbal Apt _____ | English _____ |
| Math _____ | Math Apt _____ | Math _____ |

Extracurricular activities (include athletic and non-athletic activities and work experience): _____

_____

_____

State your reasons for wanting to enter the Air Force Academy: _____

_____

I (have) (have not) received a precandidate questionnaire from the Air Force Academy.

I will greatly appreciate your consideration of my request for a nomination to the Air Force Academy.

Sincerely,

*Signature* _____

# Format of Request for Service-Connected Nomination

(Use this format for either of these categories: Presidential, Children of Deceased or Disabled Veterans, or Children of Medal of Honor Recipients.)

Director of Cadet Admissions
USAF Academy, Colorado 80840

Date _____

Dear Sir:

It is my desire to attend the Air Force Academy and to serve in the United States Air Force. I request a nomination under the _____ category for the class that enters the Academy in June 1981 and submit the following data:

Name *(print as shown on birth certificate or as legally changed; attach a copy of court order, if applicable):* _____

Social security number: _____

Permanent address *(street, city, state, zip code):* _____

_____

Temporary address (if applicable): _____

Permanent phone number and area code: _____

Temporary phone number and area code (if applicable): _____

Date and place of birth *(spell out month):* _____

_____

Date of high school graduation: _____

If member of military *(list your rank, regular or reserve component, branch of service, and organizational address including PSC and box no.):* _____

_____

If previous candidate: *(list year and candidate number):* _____

**Information on Parent**

Name, rank, social security number, component and branch of service: _____

_____

Parent active duty (attach statement dated and signed by current personnel officer specifying all periods of active duty and any breaks therein.)

Parent retired or deceased (attach copy of retirement orders or casualty report; include Veterans Administration claim number and VA office where case is filed, if appropriate; include brief statement with date and circumstances of Medal of Honor award, if appropriate).

Sincerely,

*Signature* _____

# MEDICAL EXAMINATION REQUIREMENTS

An individual's medical qualification for appointment to the service academies is determined through one general standardized examination used by all academies. Examinations are conducted at designated examining centers located throughout the United States and at some overseas bases. The qualfying examination must be taken on or after 1 June of the year preceding the year of admission. Therefore, prior candidates who are reapplying must reaccomplish portions of the medical examination.

The examining facility will not make a determination of the candidate's qualification for admission. Examination results will be forwarded for review by the Department of Defense Medical Examination Review Board (DODMERB). Its final determination regarding medical qualification will be furnished to the individual and the Academy.

In order to reach an appropriate decision, the reviewing authority may ask the candidate to supply further reports of specialty consultation to clarify the significance of certain items of medical history or examination findings. Final qualification also may be withheld pending receipt by the board of certification that certain disqualifying remedial defects have been corrected. Such reports and certifications should be forwarded to the board as soon as possible.

Before taking the qualifying medical examination, Academy applicants should review their past and present medical history with the assistance of their parents and family physician. The medical history must be compiled by the examining facility with particular care and full elaboration of details. Complete documentation of all illnesses, injuries, and operations is absolutely necessary. The applicant may avoid delay in evaluation of the medical qualification by obtaining statements from the attending physician or from hospital records concerning any past or present medical care and presenting them to the examining facility when reporting for the examination.

Applicants are encouraged to undergo a thorough dental examination by their private dentist. All decay revealed visually or by x-ray should be filled at the applicant's expense before taking the qualifying medical examination. Final qualification will be delayed pending certification that such treatment has been completed.

Applicants who wear contact lenses must remove them a minimum of 21 days prior to the medical examination.

Women will be required to have a pelvic examination and a Pap test which may be completed by their family physician.

## MEDICAL HISTORY

The following list of medical conditions is a guide for review by applicants and their parents in recalling the full medical history. The list is not all inclusive, and it should not be taken as a guide to all conditions which may or may not be disqualifying to admission. Each case is evaluated individually within established standards.

Rheumatic fever; swollen or painful joints; bone, joint or other deformity; painful or "trick" shoulder or elbow; paralysis or lameness; worn a brace or back support; "trick" or locked knee; arthritis or rheumatism.

Frequent or severe headache; dizziness or fainting spells; ear, nose or throat trouble; sinusitis, hay fever, or asthma; frequent or painful urination; kidney stone or blood in urine; sugar or albumin in urine; bed wetting; shortness of breath; pain or pressure in chest; palpitation or pounding heart; high or low blood pressure.

History of any surgical procedure; frequent indigestion; stomach, liver or intestinal trouble; gall bladder trouble or gall stones; stuttering or stammering; frequent trouble sleeping; sleepwalking; frequent or terrifying nightmares; depression or excessive worry; nervous trouble; head injuries with or without unconsciousness; loss of memory or amnesia; epilepsy or any type of seizures; tuberculosis; jaundice; goiter, tumor, growth, cyst, or cancer.

Carious teeth, defective restorations, defective prosthesis, until corrected. Sever malocclusion or malrelation of the jaws. Orthodontic appliances in place for continued treatment. *(Retainer appliances are permissible if all orthodontic treatment is completed.)* Any dental defect that interferes with clear speech.

# MEDICAL STANDARDS

A majority of candidates admitted to the Air Force Academy must meet the established standards for flying training (pilot or navigator). The remaining candidates must meet the medical standards for a commission in the United States Air Force at the time of graduation. Each applicant's report of medical examination is evaluated carefully on an individual basis, and no list of standards can cover all cases. However, those standards which apply to the greatest number of applicants are outlined below.

## PILOT

*Visual Acuity*—Distant: 20/20 or better uncorrected in each eye. Near: 20/20 or better uncorrected in each eye.

*Refractive Error*—Farsightedness (hyperopia) no greater than a +1.75 diopters and nearsightedness (myopia) no greater than a —0.25 diopters in any one meridian, and the astigmatic error must not exceed 0.75 diopters.

*Hearing*—Maximum hearing loss cannot be greater than as follows: (ISO Standards 1964)

Each ear:

| Frequency | 500 | 1000 | 2000 | 3000 | 4000 | 5000 |
|---|---|---|---|---|---|---|
| Loss | 25 | 25 | 25 | * | * | * |

*No more than an average of 45 decibel loss for both ears at each frequency.

*Standing Height*—64 inches minimum to 76 inches maximum.

*Weight*—Must be proportionate to height.

*Sitting Height*—34 inches minimum to 38½ inches maximum, measured while sitting erect, the distance from top of head to chair seat.

## NAVIGATOR

*Visual Acuity*—Distant: 20/70 or better uncorrected in each eye, correctable with ordinary glasses to 20/20 in each eye. Near: 20/20 or better uncorrected in each eye.

*Refractive Error*—Farsightedness (hyperopia) no greater than a +3.00 diopters and nearsightedness (myopia) no greater than a —1.50 diopters in any one meridian, and the astigmatic error must not exceed 2.00 diopters.

*Standing Height, Sitting Height, Weight*—Same as pilot standards.

## COMMISSION

*Visual Acuity*—Distant: correctable to 20/40 in one eye and 20/70 in the other, or 20/30 in one eye and 20/100 in the other, or 20/20 in one eye and 20/400 in the other. Near: correctable to 20/20 (J-1) in one eye and 20/30 (J-4) in the other.

*Refractive Error*—In spherical equivalent of not more than +8.00 or —8.00 diopters.

*Standing Height*—60 inches minimum to 80 inches maximum.

*Weight*—Must be proportionate to height.

*Hearing*—Same as pilot standards.

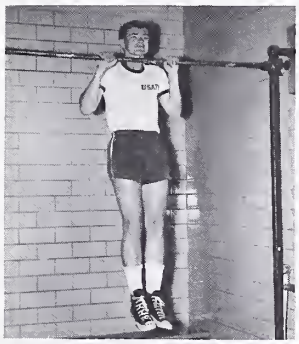
### Commission Height-Weight Standards

The weight standards below ordinarily will not be waived. However, exception to the standards may be granted if a generally large bone structure and large, well proportioned muscle masses without evidence of thick fat layers accounting for the excess weight.

| MEN | | | WOMEN | | |
|---|---|---|---|---|---|
| HEIGHT | WEIGHT | | HEIGHT | WEIGHT | |
| *Inches* | *Minimum* | *Maximum* | *Inches* | *Minimum* | *Maximum* |
| 60 | 100 | 146 | 60 | 92 | 124 |
| 61 | 102 | 149 | 61 | 95 | 127 |
| 62 | 103 | 151 | 62 | 97 | 128 |
| 63 | 104 | 155 | 63 | 100 | 132 |
| 64 | 105 | 159 | 64 | 103 | 135 |
| 65 | 106 | 163 | 65 | 106 | 138 |
| 66 | 107 | 166 | 66 | 108 | 141 |
| 67 | 111 | 171 | 67 | 111 | 145 |
| 68 | 115 | 176 | 68 | 114 | 150 |
| 69 | 119 | 181 | 69 | 117 | 154 |
| 70 | 123 | 186 | 70 | 119 | 158 |
| 71 | 127 | 191 | 71 | 122 | 162 |
| 72 | 131 | 196 | 72 | 125 | 167 |
| 73 | 135 | 201 | 73 | 128 | 171 |
| 74 | 139 | 206 | 74 | 130 | 175 |
| 75 | 143 | 211 | 75 | 133 | 179 |
| 76 | 147 | 216 | 76 | 136 | 184 |
| 77 | 151 | 221 | 77 | 139 | 188 |
| 78 | 153 | 226 | 78 | 141 | 192 |
| 79 | 157 | 231 | 79 | 144 | 196 |
| 80 | 161 | 236 | 80 | 147 | 201 |

# PHYSICAL APTITUDE EXAMINATION ITEMS

Candidates are advised to prepare for this exam by engaging in vigorous physical activities and by practicing on specific items. The items included in this examination are listed below.



*PULLUPS (Men)*—From a momentary hang position on a horizontal bar, palms away from face, elevate the body until chin is above the bar. Return to straightarm hang position and repeat as many times as possible.

*FLEXED ARM HANG (Women)*—You are positioned by means of an elevating device (step ladder, platform, etc.) so that your chin is above the bar, your elbows are flexed, and your chest is close to the bar. Use an overhand grasp, palms away from body, and maintain a chin-above-bar position as long as possible.

*300 YARD SHUTTLE RUN* —Run six round trips between two turning lines, 25 yards apart, in the shortest time possible.

*STANDING LONG JUMP*—From a standing position behind a take-off line, jump forward as far as possible. Swinging arms, bending knees, and raising heels off the floor is allowed, but do not take a preliminary step or hop.

*BASKETBALL THROW*—From a kneeling position on a mat, throw a basketball overhead to attain as great a distance as possible. Three throws are allowed from behind the throwing line.

Below are the Air Force Academy PAE ranges of scores for men and women cadets who entered in the Class of 1983.

| | *Pull ups* | *Flexed Arm Hang* | *Standing Long Jump* | | *Basketball Throw* | | *300 Yard Shuttle Run* | |
|---|---|---|---|---|---|---|---|---|
| | M | W | M | W | M | W | M | W |
| High Scores | 28 | 90 sec | 10 ft 7 in | 8 ft 6 in | 108 ft | 65 ft | 41 sec | 59 sec |
| Mean Scores | 11 | 29 sec | 8 ft | 6 ft 4 in | 71 ft | 40 ft | 59 sec | 69 sec |
| Low Scores | 1 | 0 sec | 6 ft 7 in | 4 ft 11 in | 40 ft | 21 ft | 69 sec | 99 sec |

# LIAISON OFFICER COORDINATORS

Liaison Officer Coordinators are Air Force Reserve Officers, not on active duty, who supervise Air Force admissions liaison officers. Anyone interested in receiving counseling assistance who does not know the name of the local liaison officer should write or call the nearest Liaison Officer Coordinator.

## *Alabama*

**Col William C. Stancik**
79 Commerce St.
Montgomery, AL 36106
Ph: 205-272-9574

## *Alaska*

**Col Stowell R. Johnstone**
3921 James Way
Anchorage, AK 99504
Ph: 907-333-4114

## *Arizona*

**Col Raymond G. Rottas**
6130 North 3rd Ave.
Phoenix, AZ 85013
Ph: 602-265-5346

## *Arkansas*

**Col Kenneth R. Walker**
Route 2, Box 38
Russellville, AR 72801
Ph: 501-968-2797

## *California*

**Col Annie A Jervey**
P.O. Box 480, Main Station
Seal Beach, CA 90740
Ph: 213-592-3071

**Col John R. Madden**
12590 E. Morningside Lane
Clovis, CA 93612
Ph: 209-299-7764

**Col A. Hal Parks, Jr.**
4542 Don Tonito Dr.
Los Angeles, CA 90008
Ph: 213-292-7201

**Brig Gen Louis C. Riess**
1111 Church St.
Pasadena, CA 91105
Ph: 213-799-1202

**Col Francis F. Storm, III**
P.O. Box 614
Diablo, CA 94528
Ph: 415-837-7615

**Col Nairne F. Ward, Jr.**
84 Adam Way
Atherton, CA 94025
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**Lt Col William Gunther**
12576 Perla Court
San Diego, CA 92128
Ph: 714-487-2235

**Col Caesar A. Ricci**
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Sunnymead, CA 92388
Ph: 714-656-1179

**Maj Jimmie A. Johnson**
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Fair Oaks, CA 95628
Ph: 916-961-8092

## *Colorado*

**Col Donald S. Peraro**
5830 S. Delaware St.
Littleton, CO 80120
Ph: 303-798-5977

**Lt Col Frank D. Watson**
2424 N. Tejon St.
Colorado Springs, CO 80907
Ph: 303-635-8319

**Capt Robert J. Powers**
1424 45th Ave.
Greeley, CO 80631
Ph: 303-351-6517

## *Connecticut*

**Lt Col Harry T. Cornelius**
10 Ridgebrook Dr.
West Hartford, CT 06107
Ph: 203-521-1393

## *Delaware*

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Box 175
Dagsboro, DE 19939
Ph: 302-732-6022

## *Florida*

**Col Robert A. Brooks**
125 Spring Isle Trail
Maitland, FL 32751
Ph: 305-862-8367

**Lt Col William H. Carr**
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N. Miami, FL 33161
Ph: 305-431-7194

**Lt Col Thomas D. Kemp III**
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Jacksonville, FL 32211
Ph: 904-641-6570

## *Georgia*

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2388-B Lawrenceville Hwy.
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Ph: 404-634-9824

## *Hawaii*

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3277 Manoa Rd.
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## *Idaho*

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340 Lauder Drive
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Ph: 208-882-5647

## *Illinois*

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Ph: 312-668-7757

**Lt Col Richard E. Carver**
603 E. War Memorial Dr.
Peoria, IL 61614
Ph: 309-691-3430

## *Indiana*

**Lt Col Elmer J. Molchan**
P.O. Box 8104
Merrillville, IN 46410
Ph: 219-887-0252

**Lt Col Wayne K. Morgan**
6076 Rucker Road
Indianapolis, IN 46220
Ph: 317-253-0478

## *Iowa*

**Col Severd V. Johnson**
Rural Route 1
Agency, IA 52530
Ph: 515-937-5310

### *Kansas*

**Col Ralph S. Titus**
151 S. Dartmouth Dr.
Manhattan, KS 66502
Ph: 913-537-7656

### *Kentucky*

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328 East Young.
Morganfield, KY 42437
Ph: 502-389-4744

**Capt Dale C. White**
840 Summerville Dr.
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### *Louisiana*

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14021 Woodland Ridge
Baton Rouge, LA 70816
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**Lt Col William L. Mattison**
301 Country Club Rd.
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### *Maryland*

**Col Bernard A. Enis, Jr.**
9272 Maple Rock Dr.
Ellicott City, MD 21043
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### *Massachusetts*

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### *Michigan*

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**Lt Col John A. Alexander**
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East Tawas, MI 48730
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**Col David H. Curl**
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Kalamazoo, MI 49009
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### *Minnesota*

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Excelsior, MN 55331
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**Maj Dennis J. Sultany**
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### *Mississippi*

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### *Missouri*

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### *Montana*

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Bozeman, MT 59715
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### *Nebraska*

**Lt Col Thomas H. Olson**
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**Col James L. Murphy**
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### *New Hampshire*

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### *New Jersey*

**Lt Col Thomas A. Greene**
35 Tyler St.
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Ph: 201-729-2539

**Capt Anthony T. Greski, Jr.**
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Ph: 609-267-9304

### *New Mexico*

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**Col James P. Theoharides**
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**Maj David R. Fisher**
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**Lt Col James T. Gooding**
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High Point, NC 27260
Ph: 919-885-5352

### *North Dakota*

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**Col Frederick E. Nickel**
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Brecksville, OH 44141
Ph: 216-526-4589

**Col John W. Young**
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Lancaster, OH 43130
Ph: 614-653-1944

**Maj Louis E. Woods, Jr.**
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Ph: 419-382-2113

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### *Oregon*

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Sharon, PA 16146
Ph: 412-347-3330

**Maj Harry A. Moseley, Jr.**
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Ph: 215-929-9642

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### *South Dakota*

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### *Tennessee*

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**Col Robert L. Sult**
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**Lt Col Billy E. Askins**
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**Lt Col Eugene F. Sullivan, Jr.**
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Ph: 512-492-3793

**Maj Carey F. McWilliams**
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Ph: 512-629-1014

**Lt Col Gary W. Hentze**
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Ph: 817-277-9307

### *Utah*

**Lt Col Dale J. Laub**
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### *Vermont*

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**Col James T. Lucas, Jr.**
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### *Washington*

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**Lt Col William F. Nielsen**
S 2401 Garfield Rd.
Spokane, WA 99203
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# QUESTIONS AND ANSWERS

## Admission and Preparation

Air Force Academy admissions procedures are not complicated, but an applicant must follow the requirements specifically as outlined in the Admissions and Preparation chapters of this catalog. To provide assistance to the applicant in understanding the most important facts, the questions that previous applicants have most frequently asked are given below with appropriate answers.

Q. *Who can become a cadet?*

A. Admission is open to young men and women of good moral character without regard to race, creed or national origin. Candidates must be citizens of the United States (unless applying as an allied student from the American Republics or the Philippines). A candidate must be unmarried without dependent children, and must be at least 17 years of age and not past the 22nd birthday on 1 July of the year of admission.

Q. *I don't know my Congressman or Senators. How can I get a nomination?*

A. It is not necessary to know them personally. Apply to your Congressional Representative and to both of your Senators by mail, following the application format in this catalog. Each Member of Congress is authorized to have five appointees attending the Academy at any one time. Each Congressman is permitted to nominate up to ten candidates for each vacancy he or she has. Nominations are made primarily on the basis of merit as evidenced by school records and tests. If you receive a nomination but are not selected to fill the Congressman's vacancy you will still have a chance to become a cadet if you meet the qualifications. Each year a number of the best qualified alternate Congressional nominees are appointed to bring the entering class up to authorized strength.

Q. *When should I apply for a Congressional nomination?*

A. The application process begins approximately a year before you want to enter. A class enters in the early summer each year. First, you should write to the Academy to request a precandidate questionnaire. To enter in the summer after you graduate from high school, write preferably during the spring of your junior year or the early summer. If you are a senior or have already graduated, you should write as soon as possible. Along with the precandidate questionnaire the Academy will send you an Admissions Guide explaining the nomination categories. You should apply for a nomination in one or more of the categories authorized by law. 85% of the authorized nominations are allotted to Members of Congress.

Q. *I attend a small rural high school. Will that hinder my chances of getting into the Academy?*

A. Not at all. Candidates are nominated by their Congressmen from all geographical areas and from both small and large high schools. The Academy seeks to select each cadet class from the diversity of the nation's population.

Q. *I am in college now. Is it too late to enter the Academy?*

A. No, unless you would be past your 22nd birthday on 1 July of the year of admission. However, you must remain at the Academy for four years even though you have had previous college credit.

Q. *My father was in the armed forces. Will this help me to get a nomination?*

A. It could improve your chances.Children of career members of regular and reserve forces who are on active duty or who are retired may apply under the Presidential category. They may also apply for a Congressional nomination.

Q. *If I obtained a nomination but failed to receive an appointment, am I eligible to apply for the Academy again?*

A. Yes, but you must obtain a new nomination to become a candidate again.

Q. *Can I apply for the Air Force Academy Preparatory School if I don't receive an appointment to the Academy?*

A. No. An Academy candidate who fails to receive an appointment will automatically be evaluated for possible admission to the Prep School. If the criteria are met, an offer of admission will accompany the candidate status notice in May.

Q. *Do the admissions tests count a great deal in selection of candidates for Academy appointments?*

A. Each candidate is required to take either the College Board Scholastic Aptitude Test or the American College Testing Program. The results of these tests do weigh heavily in the Academy's overall evaluation of a candidate. Because the scores are important, it is advisable to take one of these testing programs in your junior year in high school. This will indicate your scholastic qualifications and enable you to prepare additionally if your scores are not high enough. After you become a candidate, you can take the tests in your senior year.

Q. *How do I go about taking these tests?*

A. See your guidance counselor to obtain registration instructions. It is your responsibility to register for the tests and to have your scores forwarded to the Air Force Academy.

Q. *When will I be allowed to take the Service Academy Medical Examination?*

A. If your precandidate questionnaire indicates that you have the potential to qualify for admission, you will be scheduled to take the medical exam. You will not be scheduled for the medical or allowed to continue processing if your questionnaire does not indicate that you have the potential to qualify.

Q. *What are the visual requirements to qualify for Air Force flying training?*

A. Pilot qualifications require 20/20 vision uncorrected by glasses. Navigator qualifications require 20/70 or better vision corrected to 20/20 by glasses. Commission-only qualifications require that vision must be correctable to standards with glasses.

Q. *If I qualify to be a pilot am I required to take pilot training?*

A. It is not mandatory, but most of the pilot-qualified cadets volunteer to enter pilot training following graduation from the Academy. There are other career areas open to Academy graduates who do not qualify for flying.

Q. *Is it difficult to pass the physical aptitude examination?*

A. No, any candidate who has been reasonably active physically and who has normal coordination and stamina rarely fails this test. The individual who avoids athletic activities and exercise is unlikely to pass the test, and even less likely to meet the demands of the rigorous physical education program at the Academy.

Q. *How can I prepare for the Air Force Academy to improve my chances of receiving a nomination and an appointment?*

A. You will be assured of the most adequate preparation if you start at the junior high level to acquire an adequate background in English and mathematics. Continue your preparation in senior high with intensive English and math courses and take additional courses to enhance your preparation such as: physics; biology, chemistry, foreign language, history, government, and geography. Completing other basic courses in the sciences, social sciences, and humanities will be helpful.

Q. *Do I have to be an "A" student to get into the Academy?*

A. No. But you should strive to obtain the best possible grades and to rank high in your class scholastically.

Q. *Will it help my chances if I participate in sports and other extracurricular activities?*

A. Yes, definitely. A student should seek to develop the personal traits which will cultivate leadership in school and community activities. The Academy evaluates leadership potential by a candidate's record of extracurricular activities, or in lieu of those activities, the jobs he or she has held are considered.

Q. *What are the admissions opportunities at the Air Force Academy for members of minority groups?*

A. The Academy is making an extensive effort to contact minority group students who otherwise might not apply for admission. Adequate preparation for the Academy admission exams and other criteria is vitally important. If you need special assistance or advice on preparation, write to the Minority Affairs Division of the Admissions Liaison Office, USAF Academy, CO 80840.

Q. *Is there any special advice for women to help them in preparing for the Academy?*

A. Both men and women candidates are selected on the basis of academic achievement, leadership potential, and physical abilities. Women cadets must participate in the same type of strenuous program as men cadets. Therefore, women should not neglect their physical preparation which will prove vitally important to overall success at the Academy. Women should also prepare for the extensive math and science courses required in the academic core curriculum to the same degree that they prepare for the English and humanities courses. Women should note the academic majors offered and recognize that some of the traditional subjects of interest to women are not available. They should also recognize that Air Force career areas open to women Academy graduates are limited.

Q. *What can women do to prepare for the Academy's physical aptitude examination?*

A. The development of upper-body strength is very important. Cross-country runs, swimming, push-ups, chin-ups, and flexed-arm hang are important conditioning activities. You may ask your physical education instructor for advice on additional exercises.

Q. *What reasons are given most frequently by cadets who resign from the Academy within a year after they enter?*

A. 1. They were not sufficiently motivated for the demands of military life.
2. They came to the Academy primarily because their parents wanted them to attend a service academy, and not because they were personally motivated.

3. They realized that the military and academic programs were demanding, but they failed to understand the extent of the duties and pressure involved. Some were expecting a more relaxed, college-type AFROTC program than the discipline of a service academy.

## Academy Curriculum

Q. *Will I receive a well-rounded education at the Academy?*

A. Yes, the curriculum is based on three phases—academic, military, and athletic—which are considered necessary to provide the needed educational experience for future Air Force officers. Cadets receive college-level credits for successful participation in all three phases.

Q. *In which phase of the curriculum are the most credits required?*

A. The academic program, conducted during fall and spring semesters for nine months of each year, accounts for a majority of the required credit hours. Each cadet must complete prescribed core courses divided on a fairly equal basis between the basic and engineering science subjects and the social science and humanities subjects. Each cadet must also choose and complete an academic major in a subject area.

Q. *How many majors are offered?*

A. At present, there are 23 majors including 15 in science and engineering fields and 8 in social science and humanities disciplines. The choice of a major remains with individual cadets, based on their aspirations and abilities. Cadets are advised, however, that there are more Air Force career opportunities for officers with academic backgrounds in science and engineering fields. Before selecting a major, each cadet is counseled by a squadron faculty officer in relation to Air Force career areas and opportunities to enter various careers.

Q. *What is the total curriculum load for cadets?*

A. The total four-year Academy requirement to complete the Bachelor of Science degree is at least 179 semester hours. This requirement is approximately 25% greater than the B.S. degree requirement at most civilian universities. The additional hours provided at the Academy are necessary to conduct the military and physical training as well as the academic education determined necessary to prepare highly qualified officers. By utilizing a summer term of nine weeks in addition to the nine-month academic year, the Academy can accomplish this instruction without seriously overloading the individual cadet.

Q. *Can cadets take elective courses?*

A. Yes, the majors program allows cadets to concentrate courses in a subject area and to choose some electives within their major fields. Additionally, the Academy offers an enrichment program which permits proficient cadets to exceed the minimum course load and take extra courses. There are other ways in which students can advance academically through transfer credit; course validation, acceleration, and substitution; attending honors courses; and auditing courses for non-credit.

Q. *What type of faculty teaches the academic courses?*

A. The faculty is composed primarily of military officers, including men and women, with a majority being members of the Air Force. There are also a few officers from the United States Army and Navy and from the military forces of allied nations serving on the faculty. Several of the allied officers are assigned to the Foreign Languages

Department to teach the seven languages offered to cadets. The U. S. State Department provides one foreign service officer each year to teach in the Political Science Department. The Academy has a distinguished visiting professor program enabling a few departments to acquire a civilian professor on a one-year appointment. The Academy also brings a large number of scholars and public figures to the campus as part of the distinguished speakers' program or as departmental speakers or consultants.

Q. *Do cadets get to know the faculty members?*

A. Yes, faculty members are available to give individual attention to cadets and to provide extra instruction to those who are having difficulty in a subject. In addition, they participate in many other activities besides teaching their classes such as serving as squadron faculty officers, participating in cadet aviation programs, serving as officer representatives for athletic teams, sponsoring cadet intercollegiate clubs, and assisting in summer military training programs. Through such diversified activities, the military faculty not only provides cadet instruction but also serves to motivate cadets toward an Air Force career.

Q. *What type of instruction does the faculty provide?*

A. The average class is small, 15 to 20 students, which allows the instructor to establish a rapport with each cadet and to recognize a student's strengths and weaknesses. The faculty uses the seminar approach to instruction, when possible, keeping lectures to a minimum. Many of the courses include Air Force applications, especially those in science and engineering which incorporate various aspects of flight. On the other hand, the social science and humanities courses provide a liberal education to give the future Air Force officer a broad background in such areas as writing and speaking, history and political science, management and behavioral science.

Q. *What if a cadet has trouble making the required grades?*

A. Assistance is readily available for cadets having academic difficulty. Cadets are encouraged to contact their instructors at any time to request extra instruction conducted during a free period or during an hour scheduled for that purpose each weekday afternoon after classes. Cadets are graded frequently to keep them informed of their status in all courses. Once a semester cadets meet with their squadron faculty officers to discuss their progress and review their future academic plans. First class cadets acting as squadron academic officers arrange cadet tutors for underclass cadets who are experiencing academic difficulties.

Q. *What happens if a cadet is still deficient at the end of a semester?*

A. The Academy Board makes the final determination on separation or retention for cadets who are still deficient when the semester ends. For those cadets retained, the board directs appropriate remedial action, often recommending attendance at Academic Summer School held at the Academy. Cadets who volunteer or are directed to attend summer school must forfeit their three-week leave.

Q. *Do cadets have plenty of time to study?*

A. Yes, study periods are scheduled during each weekday. Three hours between 8:00 p.m. and 11:00 p.m. are set aside each evening for "academic call to quarters."

Q. *Is class attendance mandatory?*

A. Yes, cadets are required to attend all academic, military, and physical education classes unless officially excused. They are expected to be prepared to participate in all classes. The cadet spends an average of five hours in classes each day, Monday through Friday.

Q. *Do Academy graduates have a chance to obtain an advanced degree?*

A. A few graduates will obtain scholarships to attend civilian graduate schools immediately after graduation. Graduates in the top 15% of each class will normally be assured of future graduate education for a master's degree, provided they perform at a high level as Air Force officers. These graduates will be eligible for attendance after three years on active duty. Other graduates may also have opportunities for graduate education through the Air Force Institute of Technology (AFIT) programs. Most degree-granting programs are conducted in conjunction with civilian universities. In addition, many Academy graduates attend one or more of the armed forces professional military schools during their careers.

Q. *How does the Air Force Academy compare with leading civilian universities?*

A. The Academy is like many other institutions of higher education in that young men and women are prepared for useful careers as citizens and professionals. Unlike civilian institutions, however, the Academy's method of instruction also provides career motivation and leadership training so that our graduates might spend a lengthy tenure in the nation's armed services. Like most civilian institutions, the Academy's curriculum is accredited. When last accredited by the North Central Association of Colleges and Schools, their report lauded the Academy for successful overall development of qualified U.S. Air Force career officers and for many individualized achievements of cadets and graduates. The Air Force Academy has been credited with instituting many new concepts in service academy education.

Q. *What does military training include?*

A. The military training program includes military studies courses, leadership experiences, and aviation courses. The training is conducted during the fall and spring semesters and the nine-week summer term. Each cadet completes core military courses plus electives from several optional offerings. The training emphasizes the learning vital to the basic foundation of a junior officer in the Air Force.

Q. *Will I enjoy this training program?*

A. Yes, most cadets find this unique training quite interesting. They especially look forward to optional summer instruction including aviation, navigation, soaring, parachuting, and leadership experiences both at the Academy and away.

Q. *What military courses are required?*

A. The required courses cover professional military studies during all four years. Required summer programs are: basic cadet training; three-week tour of duty with an Air Force unit; survival, evasion, resistance, and escape (SERE) training; leadership position in training programs for lower class cadets; and three optional programs of the individual cadet's choice.

Q. *What flying courses are available to cadets?*

A. All fourth class cadets are required to complete an introductory course in aviation fundamentals. All first class cadets must complete a flight core course, either pilot indoctrination or advanced aviation studies. Cadets who

are qualified may take basic and advanced aviation instruction in various phases of flying training. Upperclass cadets who have completed advanced flying programs serve as instructors in many of the optional courses. They are supervised by rated (flying qualified) Air Force officers. An academic major is available in Aviation Science, which includes 12 course offerings ranging from basic aviation to advanced astronomy and avionics.

Q. *Can cadets fly as a hobby?*

A. Yes, in addition to the curricular offerings available to cadets, participation in flying is available through extracurricular clubs. Cadets may gain considerable flying experience through light aircraft training with the Cadet Aviation Club. These cadets may earn FAA (Federal Aviation Administration) certificates from private pilot through instructor pilot. The Soaring Society of America and the U. S. Parachute Association also provide appropriate ratings for cadets who qualify through completion of their requirements.

Q. *Do cadets earn Air Force flying ratings?*

A. Cadets do not earn "wings" at the Academy, nor do they receive regular Air Force pilot or navigator training while here. All cadets who are physically qualified for pilot training and are planning to attend after graduation must take the T-41 light-plane flying program during their first class year. Cadets physically qualified for and planning to enter navigator training are encouraged to take an advanced navigation course with local and cross-country flights in T-43 aircraft.

Q. *What does the athletic program include?*

A. This program encompasses three major areas: physical education instruction, intramural competition, and intercollegiate athletics. All cadets are involved in this program throughout their four years at the Academy. Athletic participation contributes greatly to the development of leadership potential in future Air Force officers. The competitive nature of athletics helps cadets to develop courage, initiative, and the desire to win.

Q. *What does the physical education area include?*

A. The Department of Physical Education directs the instructional curriculum composed of these fields: aquatics, combatives, physical development, and lifetime skills. Each cadet takes annually 40 hours of physical education, conducted primarily on a coeducational basis. Seventeen intramural sports are offered during three seasons—fall, winter and spring. Cadets are required to take part each season either in intramural or intercollegiate contests. The physical education staff consists mostly of Air Force officers who are highly qualified as instructors because of their education and experience. Upperclass cadets assist in administering the intramural teams as coaches and officials.

Q. *Does a cadet have to be an experienced athlete to play on a varsity team?*

A. The broad intercollegiate program, featuring 19 sports, enables a large number of cadets to participate. Many cadets find through intramural participation that they are skilled beyond their expectations and are capable of joining varisty teams. These teams represent the Academy in national competition against colleges and universities and other service academies. The Department of Intercollegiate Athletics administers varsity athletics, with military officers and civilian professionals serving as coaches.

Q. *Does the athletic program differ for men and women cadets?*

A. Women may participate in all athletic activities except for certain contact sports. A majority of the intramural teams include both men and women. Intercollegiate sports, established under rules of the National Intercollegiate Athletic Association (NCAA) are composed largely of separate men's and women's teams. Men participate individually in 17 intercollegiate sports; women field their own teams in 10 sports. Both men and women are on the rifle and pistol teams.

Q. *Can a cadet major in physical education?*

A. No, there is no specific major in this subject area. However, four academic courses in physical education are offered as electives for biological science majors and as open options for cadets interested in pursuring a graduate physical education degree during their Air Force careers. Some cadets who receive graduate degrees in this major will ultimately return to serve on the Academy's physical education staff.

## Cadet Life

Q. *What is the campus environment like at the Academy?*

A. When people first see the Academy they immediately realize that it is different from many other institutions of higher education. Most apparent is the spectacular natural setting for the campus with buildings designed in a contemporary architectural style. The pattern of cadet life creates a different atmosphere from that of civilian institutions. The entire life of each cadet is based on the Academy's mission to produce highly educated and motivated Air Force officers. The daily schedule follows a demanding timetable with compulsory attendance at academic, military, and athletic activities. Strict rules govern the condition of cadet living quarters, personal appearance, conduct and leisure time.

Q. *Does living in the Cadet Wing add to this environment?*

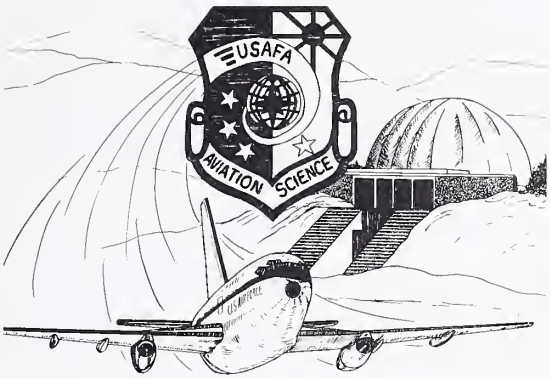
A. Very definitely. The Cadet Wing is patterned after an Air Force unit with cadets assuming responsibility for management of their own military organization. This leadership laboratory eventually allows all cadets to perform command or staff functions and to gain leadership experiences that will prove beneficial when they become Air Force officers.

Q. *Do cadets like their lifestyle in the Cadet Wing?*

A. Yes, in spite of the military control exerted within the wing, most cadets do have enjoyable and worthwhile experiences. The wing is composed of men and women cadets from throughout the country, several students from allied nations, and a few exchange students from other service academies. It is not likely that you would have an opportunity to experience such a variety of associations in a civilian university. Cadets may remember many humorous and pleasant incidents from their experiences in the wing.

Q. *How is a cadet assigned to a room and a roommate?*

A. Each cadet is assigned to one of forty squadrons. You will be assigned a roommate according to squadron policies, but in all cases, you will room with a member of the same sex and the same class. Several things are considered in roommate assignments including your roommate preference and your academic and military performance. Cadet room assignments are made two times during the academic year, and you may keep or change a roommate at these times.




# SUMMARY OF COURSE DESCRIPTIONS

Courses offered in the curriculum including core and majors courses.

Aeronautics
Airmanship
Astronautics
Astronomy
Aviation
Behavioral Sciences
Biological Sciences
Chemistry
Civil Engineering
Computer Science
Economics
Electrical Engineering
Engineering
English
Fine Arts
Foreign Languages
- Arabic
- Chinese
- French
- German
- Japanese
- Russian
- Spanish

Geography
History
Humanities
Law
Management
Mathematics
Mechanics
Military Training
Navigation
Philosophy
Physical Education
Physics
Political Science
Professional Military Studies

Descriptions of the courses to be offered during the academic year 1980-81 are listed by subject in alphabetical order. Course numbers have a general meaning. The first digit of a course number usually indicates the class year for which the course is designed: 100 series for the Fourth Class year; 200 series the Third Class year; 300 series the Second Class year; and 400 series the First Class year.

Following the description of each course is a code such as 0, 1 or 2. This number is the course unit value which is used to determine a cadet's course load for a semester. After this number there may be an additional number in parentheses which is used for scheduling purposes and identifying the number of class hours the course meets per academic lesson.

Final examination or final report requirements, course prerequisites, and semester hours are shown at the end of each course description. A designation of Pass/Fail at the end of a course description means that no letter grade is given and the student receives a Pass or Fail mark for the entire course. Courses without this designation are graded.

# Course Descriptions

## Aeronautics (Aero)

*Offered by the Department of Aeronautics*

**Aero 311. Fundamentals of Aeronautics** 1(1)

Airfoil subsonic flow pattern and pressure distribution. Typical supersonic flow effects. Wing lift, drag and pitching moment. High lift devices. Wing planform effects and airplane drag. Thrust and drag variations with Mach number. Airplane performance, energy height and specific excess power. Minimum-time climb trajectories. Airplane stability and control contributions of the wing-aileron, vertical tail-rudder and horizontal stabilizer-elevator (elevon). Final exam. Prereq: Mech 110. Sem hrs: 3 fall or spring.

**Aero 312. Introductory Engineering Thermodynamics** 1(1)

Fundamental aspects, concepts, and laws of thermodynamics. Energy and the first law. Study of fluid properties and thermodynamic state. States of simple substances. Energy analysis of thermodynamic systems. Entropy and the second law. Reversible and irreversible processes. Applications of the second law. Thermodynamics of propulsion. Final exam. Prereq: Math 132. Sem hrs: 3 fall or spring.

**Aero 356. Flight Mechanics I** 1(1)

Airplane equations of motion. Takeoff and landing, steady climbs and descents, cruise flight (range and endurance). Accelerated performance, turns. Static and dynamic stability. Control and handling qualities. Lab. Final exam. Prereq: Aero 311. Sem hrs: 3 fall or spring.

**Aero 363. Heat Transfer** 1(1)

Energy transport by conduction, convection, and radiation. General heat conduction differential equation and its application to simple conduction problems with and without heat generation, heat flow in fins, and unsteady heat flows. Treatment of fluid dynamics and thermal boundary layers as applied to flat plates in forced convection. Reynold's analogy. Black and gray body radiation, and radiation inside enclosures. Lab. Final exam. Prereq: Aero 312. Sem hrs: 3 fall or spring.

**Aero 371. Aerodynamics I** 1(1)

The fluid medium, kinematics and dynamics of a fluid field, flow about a body, thin airfoil theory and the finite wing, compressible flow and energy relations, applications of one-dimensional compressible flow including shocks and Prandtl-Meyer flow. Lab. Final exam. Prereq: Aero 311; Completed or enrolled in Aero 312; Math. 210. Sem hrs: 3 fall or spring.

**Aero 372. Aerodynamics and Design** 1(2)

Application of lifting line theory to the determination of span and chordwise load distributions on lifting surfaces. Effect of shape and planform on external aerodynamic load distributions. Determination of aerodynamic loads as a function of flight conditions. External and internal design of major aircraft components (wings, fuselages, tail sections). Lab. Final report. Prereq: Mech 210; completed or enrolled in Aero 371. Sem hrs: 3 fall or spring.

**Aero 434. Aircraft and Engine Performance Laboratory** 1(2)

Selected experiments in the fields of flight mechanics and aerospace propulsion. A laboratory course designed for students not pursuing an aeronautical engineering major. Final report. Prereq: Aero 312. Sem hrs: 3 fall or spring.

**Aero 450. Aeronautical Laboratory** 1(2)

Selected experiments in the fields of aerodynamics, gas dynamics, propulsion, and flight mechanics. Utilization of wind tunnel in design project. Lab. Final report. Prereq: Aero 371; Aero 356. Sem hrs: 3 fall or spring.

**Aero 457. Flight Mechanics II** 1(1)

Continuation of Aero 356. General equations of aircraft motion. Topics in accelerated performance. Extension of aircraft stability, control and handling qualities analyses. Lab. Final exam. Prereq: Aero 356; Math 351. Sem hrs: 3 fall or spring.

**Aero 461. Propulsion I** 1(1)

Chemical rockets and airbreathing engines. Fluid mechanics, thermodynamics and chemistry of propulsion. Rocket nozzle performance. Cycle analysis and preliminary design of ramjets, turbojets and turbofans. Lab. Final project. Prereq: Aero 371. Sem hrs: 3 fall or spring.

**Aero 462. Propulsion II** 1(1)

Advanced studies of airbreathing engines and rocket propulsion systems. Analysis of advanced cycles; off-design analysis of turbojet and turboprop engines. Analysis of components: inlets, compressors, burners, turbines, exit nozzles. Solid propellant and non-chemical rockets. Final project. Prereq: Aero 461. Sem hrs: 3 fall or spring.

**Aero 463. Advanced Topics in Aeronautics** 1(1)

Topics of current interest in aerodynamics, propulsion, performance, stability and control. Final exam. Prereq: Aero 471 or department permission. Sem hrs: 3 spring.

**Aero 464. Aircraft Design** 2(2)

Fundamentals of design presented through conceptual design of an advanced aircraft. Determination of vehicle configuration to meet given specifications involving consideration of vehicle aerodynamics, propulsive system, flight mechanics and structures. Final Report. Lab. Field trip. Prereq: Aero 356, Aero 471. Sem hrs: 6 spring and fall.

**Aero 466. Propulsion Design** 2(2)

Fundamentals of airbreathing engine design presented by the preliminary design of the propulsion system for an advanced aircraft with specific mission require-

ments. Determination of on- and off-design engine parameters and engine size. Preliminary component design and integration. Aircraft performance estimates based on installed engine performance. Field trip. Lab. Final report. Prereq: Aero 461. Sem hrs: 6 spring.

**Aero 471. Aerodynamics II** 1(2)

One-dimensional gas dynamics and wave motion, waves in supersonic flow, flow in ducts and wind tunnels, equations of frictionless flow, small perturbation theory, slender body theory, similarity rules, introduction to viscous flows. Lab. Final exam. Prereq: Aero 371. Sem hrs: 3 fall or spring.

**Aero 472. Thermodynamics of Energy Conversion** 1(1)

Study of the laws and concepts of thermodynamics with emphasis on practical applications. Energy conservation and availability as applied to ground-based power generation, aircraft engines, ground transportation, and air-conditioning. Direct energy conversion, atomic, solar, hydro, wind and tidal energy. Field trip. Final report. Prereq: Aero 312. Sem hrs: 3 fall or spring.

**Aero 495. Special Topics** 1(1-2)

Selected topics in aeronautics. Final exam or final report. Prereq: department permission. Sem hrs and offering time determined by department (not more than 3 sem hrs).

**Aero 499. Independent Study** 1(0)

Individual study and research supervised by a faculty member. Topic established with the department head. Final report. Sem hrs: 3 fall or spring.

## Airmanship (Armnshp)

*Offered by the Deputy Commandant for Operations*

**Armnshp 101. Sailplane Introduction** 0(0)

Required course for the Fourth Class to provide an introduction to the basic principles of flying, motivation for further development of aviation skills, and an appreciation for related responsibilities. Consists of 1-3 sailplane sorties. Pass/Fail. Sem hrs: 0 fall or spring.

**Armnshp 440. Pilot Indoctrination Program** 1(3)

**Armnshp 441. Pilot Indoctrination Program** 0(0)

Required course for all physically qualified First Classmen who volunteer to attend USAF Undergraduate Pilot Training following graduation. Includes ground training for T-41 aircraft and FAA Private Pilot exam, dual flight instruction and solo flight training.

Armnshp 440. (Summer credit awarded only when course is completed in addition to normal summer training.) Final exam. Prereq: 1/C standing. Sem hrs: 3 summer, fall or spring.

Armnshp 441. (Fulfills one-half of the requirement for Mil Tng 400, First Class summer training.) Final exam. Prereq: 1/C standing. Sem hrs: 3 summer.


**Armnshp 449. Private Pilot, Ground School** 0(1)

Ground school to prepare cadets for the FAA Private Pilot written examination. Any cadet who possesses an FAA Private Pilot Airplane Rating may validate this course. Pass/Fail. Sem. hrs: 1 fall or spring.

**Armnshp 450. Airplane Rating, Private** 0(0)

Dual instruction and solo flight training to complete the requirements for an FAA Private Pilot Certificate. This training, conducted through the Cadet Aviation Club, is available to a limited number of cadet volunteers. Prereq: Armnshp 449 or Private Pilot Ground School Certificate. Any cadet who possesses an FAA Private Pilot Airplane Rating may validate this course. Pass/Fail. Sem hrs: 1 summer, fall or spring.

**Armnshp 451. Glider Instruction, Dual/Solo** 0(1)

Dual instruction, ground school, and solo flight training which may lead to FAA Pilot Certificate Glider Rating, Private. This is an elective course offered during the academic day open to all classes, but normally pursued during the Third Class year. (Completion during summer offering fulfills requirements for Mil Tng 200.) Pass/Fail. Sem hrs: 2 summer or fall.

**Armnshp 460. Airplane Rating, Commercial** 0(0)

Dual instruction, ground school, and solo flight training to complete the requirements for an FAA Pilot Certificate-Airplane Rating, Commercial. Pass/Fail. Prereq: Armnshp 450 or FAA Private Certificate. Any cadet who possesses an FAA Commercial Pilot-Airplane Rating may validate this course. Sem hrs: 2 summer, fall or spring.

**Armnshp 461. Glider Rating, Commercial** 0(0)

Dual instruction, ground school, and solo flight requirements for a Pilot Certificate-Glider Rating, Commercial. Pass/Fail. Prereq: Armnshp 451 or FAA Pilot Certificate Glider Rating, Private. Sem hrs: 2 fall.

**Armnshp 470. Airplane Rating, Instrument** 0(0)

Dual instruction, ground school, and instrument trainer instruction to complete the requirements for an

FAA Pilot Certificate, Instrument Rating. Pass/Fail. Prereq: Armnshp 450 or FAA Private Pilot Certificate. Any cadet who possesses an FAA Instrument-Airplane Rating may validate this course. Sem hrs: 1½ summer, fall or spring.

**Armnshp 471. Glider Rating, Flight Instructor** 0(0)

Dual instruction, ground school, and solo flight requirements for an FAA Flight Instructor. Certificate-Glider Rating. Pass/Fail. Prereq: Armnshp 461 or FAA Pilot Certificate-Glider Rating, Commercial. Sem hrs: 2 spring.

**Armnshp 480. Airplane Rating, Flight Instructor** 0(0)

Meeting the requirements for an FAA Flight Instructor Certificate-Airplane Rating. Pass/Fail. Prereq: Armnshp 460. Any cadet who possesses an FAA Flight Instructor Certificate-Airplane Rating may validate this course. Sem hrs: 1½ summer, fall or spring.

**Armnshp 490. Basic Free Fall Parachuting** 0(0)

Instruction in emergency use of the parachute. Familiarizes cadet with emergency and free fall parachuting as it pertains to his/her future Air Force career. Jump requirements and performance standards are determined by the Airmanship Division consistent with Air Force directives. Successful completion entitles student to award of Basic Parachutist Badge. (Completion during summer offering fulfills ½ requirement for Mil Tng 300 or Mil Tng 400.) Pass/Fail. Prereq: Passing score on entrance physical fitness test and not completed MT 452. In summer, 1/C, 2/C or 3/C standing; in fall, 1/C, 2/C or 3/C standing, in spring, 1/C, 2/C, 3/C or 4/C standing. Training frequently conducted on weekends and seventh period training extends until evening meal. Sem hrs: 2 summer, fall or spring.

**Armnshp 491. Advanced Parachute Training** 0(0)

Ground and aerial training which allows cadets to progress from initial free fall training to the basics of delayed free falls, controlled body maneuvers, and precision landings. Introduction to instructional techniques, jumpmaster procedures, and competitive parachuting. Training frequently conducted on weekends and seventh period training extends until evening meal. Requirements are partially fulfilled toward Class B, U.S. Parachute Association License. Pass/Fail. Prereq: 3/C standing and Armnshp 490. Sem hrs: 1½ fall.

**Armnshp 492. Cadet Parachute Instructor Training** 0(0)

Trains selected cadets as instructors and jumpmasters for Armnshp 490. Cadets receive training in instructional techniques and jumpmaster procedures. Aerial training consists of proficiency jumps; ground training consists of instruction on inspection, packing, and maintenance of military and sport parachutes. Participation in spring training exercise is mandatory. Training frequently conducted on weekends and seventh period training extends until evening meal. Requirements are partially fulfilled toward a Class C, U.S. Parachute Association License. Pass/Fail. Prereq: 3/C standing, Armnshp 491 and Airmanship Division permission. Sem hrs: 2 spring.

**Armnshp 496. Cadet Parachute Instructor Duty** 0(0)

Open to selected cadets who wish to serve as instructors and jumpmasters in Armnshp 490. Cadets participate in competitive parachuting events and parachute demonstrations throughout the United States. (Completion during summer offering fulfills ½ requirement for Mil Tng 300 or Mil Tng 400.) Training frequently conducted on weekends and seventh period training extends until evening meal. Pass/Fail. Prereq: Armnshp 492 and Airmanship Division permission. Sem hrs: 2 summer, fall, or spring.

**Armnshp 497. Cadet Soaring Instructor Duty** 0(0)

Open to selected cadets who wish to serve as flight and ground instructors during the academic day and after school in Armnshp 101, 451, 461 and 471. (Completion during summer offering fulfills requirements for Mil Tng 200 or ½ requirement for Mil Tng 300 or Mil Tng 400.) Pass/Fail. Prereq: Armnshp 471. Sem hrs: 2 summer, fall or spring.

## Astronautics (Astro)

*Offered by the Department of Astronautics and Computer Science*

**Astro 332. Introduction to Astronautics** 1(1)

Fundamental analysis of the problems and principles of astronautics. Includes problem modeling, elementary error analysis, flat earth trajectories, ballistic missile trajectories, a survey of rocket propulsion, inertial navigation and guidance, physiological problems of space travel, re-entry, the space environment and present Air Force space operations. The application of the restricted two-body model to satellites and interplanetary trajectories includes integrals of the equations of motion and their constants of integration, methods of orbit description and determination, Hohmann and general transfer orbits, plane changes, satellite rendezvous, and ground traces. Final exam. Prereq: Mech 110 (120); Math 133; completed or enrolled in Physics 211. Sem hrs: 3 fall or spring.

**Astro 395. Aerospace Flight Simulation** 1(2)

An introductory and interdisciplinary course integrating pilot response to the dynamics of an aerospace flight simulator. Small teams analyze in depth one of the following areas: human response, pilot-vehicle interaction, vehicle and trajectory math models, vehicle control laws, or computer interface and software. Total system design is accomplished by management of group interaction. Flight tests are performed on the T-38 combat simulator and/or the moveable space docking simulator. Lab. Final project report. Prereq: 1/C or 2/C standing with department permission. Sem hrs: 3 spring.

**Astro 450. Principles of Airborne Fire Control** 1(1)

Current Air Force fire control systems are analyzed to explain the engineering application of vector kinetics,

kinematics, linearization theory, introduction to inertial sensors and rigid body motion. The AC-130 gunship, F-4, F-15, F-106 gun fire control systems are used to explain air-to-ground and air-to-air weapons delivery. Air-to-air missile guidance. Field trip to understand implementation of an operational system. Final exam. Prereq: Mech 320 (361); Engr 350 or El Engr 340 (332). Sem hrs: 3 fall.

**Astro 451. Astrodynamics** 1(1)
A basic course in astrodynamics based on two-body orbit mechanics. Topics include an introduction to orbit determination, time and position in the orbit, orbit maneuvers, rendezvous and docking. Emphasis is on problem solving via digital computer with specific applications toward astrodynamics. Final exam. Prereq: Completion of any core math sequence; Comp Sci 100 (200); Astro 332; Physics 211. Sem hrs: 3 fall or spring.

**Astro 452. Linear Control System Analysis and Design** 1(2)
Formulation and analysis of the linear control problem by both state variable and transform methods. Synthesis of linear control systems emphasizing the root locus method. Includes laboratory analysis and synthesis with real hardware and/or analog simulation. Final report. Prereq: Engr 350 or El Engr 340. Sem hrs: 3 fall or spring.

**Astro 453. Advanced Astrodynamics** 1(1)
A continuation of Astro 451. Topics include orbit determination, data smoothing, differential correction, general and special perturbations, and interplanetary trajectories. Course is directed toward the development of tools and skills necessary to solve realistic problems in astrodynamics. Final exam. Prereq: Astro 451. Sem hrs: 3 spring.

**Astro 454. Inertial Navigation and Guidance** 1(1)
Inertial navigation including studies of gyroscopes; accelerometers; gyrostabilized platforms, strap down platforms; system mechanization; and navigation equation development and solution. Inertial guidance including required velocity and steering equation development for boost vehicles and ICBM's. Final exam. Prereq: Astro 451; Astro 452. Sem hrs: 3 spring.

**Astro 465. Modern Control Theory and Design** 1(2)
Linear system analysis using state variable approach, phase plane analysis of linear and non-linear systems, estimation of variables, optimization theory. Design of controls for typical Air Force systems such as attitude control, IR seeker missiles, ICBM gimballed thrusters. Final project report. Prereq: Astro 452 or department permission. Sem hrs: 3 fall.

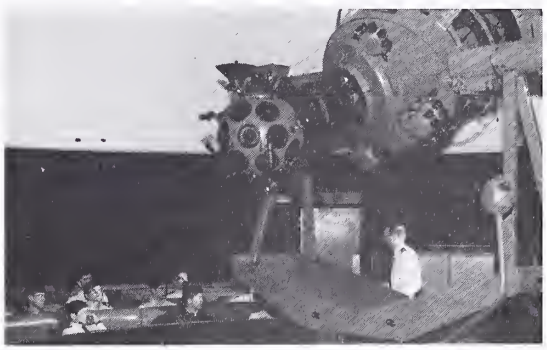
**Astro 466. Digital Control Theory and Design** 1(2)
Recent theory and developments in digital control systems related to Air Force systems. Sampled data systems, z-transform theory, digital estimation, optimal digital systems. Man-in-the-loop systems and system identification techniques. Design of typical digital control systems using minicomputers. Field trip. Final project report. Prereq: Astro 465 or department permission. Sem hrs: 4 spring.

**Astro 467. Mission Analysis for Aerospace Vehicles** 1(1)
Analysis of aerospace missions and interaction of mission objectives with vehicle design requirements and constraints. Includes systems analysis of propulsion, guidance, navigation, attitude control, thermal control, life support, power and communications requirements. Preliminary design of a launch vehicle or spacecraft to satisfy a specific mission. Digital computer used as a design tool. Field trip. Final report. Prereq: Astro 332; Astro 451. Sem hrs: 3 fall.

**Astro 468. Aerospace Vehicle Systems Design** 1(2)
Design of aerospace systems and subsystems. Description and applications of state-of-the-art subsystems and advanced designs. Application of tools and techniques from previous courses including digital and analog computers for analysis and synthesis. Completion or extension of design project begun in Astro 467. Field trip and lab. Final project report. Prereq: Astro 467 or department permission. Sem hrs: 4 spring.

**Astro 495. Special Topics** 1(1)
Selected topics in astronautics. Final exam or final report. Prereq: Department permission. Sem hrs and offering time determined by department (not more than 3 sem hrs).

**Astro 499. Independent Study** 1(0)
Individual study and research supervised by a faculty member. Topic established with the department head. Final report. Sem hrs: 3 fall or spring



## Astronomy

*Offered by the Aviation Science Division*

**Astronomy 371. Descriptive Astronomy** 1(1)
Discussion of fundamental concepts of astronomy. Examination of the physical aspects of the solar system: the sun, moon, planets, comets, and meteors. Introduction to the physical nature and distribution of the stars. Discussion of the structure and origin of the universe. Planetarium presentations and telescope observations of celestial objects. Flight mission to experience and analyze the motions of the heavens in an inflight environment, held in conjunction with a visit to a prominent astronomical facility. Final report. Sem hrs: 3 fall or spring.

**Astronomy 480. Introduction to Applied Astronomy** 1(1)

Spherical astronomy topics of positions, motions, stellar coordinate systems, time, and navigation. Stellar astronomy topics of distances, motions, luminosities, masses, distribution of stars, clusters, galaxies, and cosmology. Planetarium, telescope, and inflight laboratory experience in conjunction with a visit to a prominent astronomy or space facility. Final project. Prereq: 1/C or 2/C standing or department permission. Sem hrs: 3 fall or spring.

## Aviation (Av)

*Offered by the Deputy Commandant for Military Instruction*

**Av 100. Introduction to Aviation Fundamentals and Space Studies** 0(2XX)

Provides an exposure to Air Force flight activities, operations and space environment. Offers a meaningful flight experience to cadets who receive two T-37 simulator rides, a T-43 flight mission to an Air Force base, and presentations in the Planetarium. Pass/Fail. No final exam. Sem hrs: 1 fall or spring of 4/C year or summer of 3/C year.

**Av 470. Applied Aviation and Navigation Theory** 1(2)

Practical application of air navigation and aviation procedures/equipment. Includes classroom and trainer instruction in preparation for flight missions in the T-43 aircraft. Encompasses air navigation from basic dead reckoning through radio, radar, and celestial positioning techniques. Develops an insight into the requirements and responsibilities of a navigator through actual experience in a flying environment, on both local and cross-country flights. Final exam. Prereq: 1/C, 2/C, or 3/C standing. Sem hrs: 3 fall or spring.

**Av 490. Avionics Concepts and Systems Development** 1(1)

Discussion of avionics and systems including inertial, Doppler, astro trackers and radar. In depth study of the underlying theory for these systems using the T-43 as an example of a modern, integrated navigation system. Inflight application of academics in conjunction with a visit to a facility involved in the development or operation of advanced navigation systems. Final report. Sem hrs: 3 fall or spring.

**Av 493. Cadet Aviation Instructor Training** 0(0)

Trains selected cadets as instructors for aviation flying programs. Provides additional training in navigation techniques, and provides field training in astronomy and planetarium operation. To retain rating, qualified cadet instructors must maintain required instructor proficiency in subsequent semesters. (Fulfills ½ requirement for Mil Tng 300 or Mil Tng 400.) Final exam. Prereq: Av 470. Sem hrs: 3 summer.

**Av 495. Special Topics in Aviation Training** 1(1)

Selected special topics in navigation, astronomy, or aviation sciences. Final exam or final report. Prereq: Division approval. Sem hrs and offering time determined by division. (Not more than 3 sem hrs.)

**Av 498. Cadet Aviation Instructor Duty** 0(0)

Cadets maintain proficiency acquired in Av 493. Instructs in Av 470 and Av 460 classroom, trainers and flying programs. To retain rating cadet must provide 60 hours of contact time with Aviation Science Division programs each semester. No final. Prereq: Av 470 or Av 460 and Av 493. Sem hrs: 3 summer, fall or spring.

**Av 499. Independent Research and Study** 1(0)

Individual study or research in navigation, astronomy, or aviation sciences under the direction of a division instructor. Final exam or final report. Prereq: Division approval. Offering time determined by division. Sem hrs: 3.

## Behavioral Sciences (Beh Sci)

*Offered by the Department of Behavioral Sciences and Leadership*

**Beh Sci 110. General Psychology** 1(1)

Presents those determinants of behavior which contribute to physical, psychological, and social maturity. Applies psychological principles from the areas of learning, human development, perception, motivation, personality, mental health, and group processes to understanding human behavior, achieving personal adjustment and developing Air Force leadership. Final exam. Sem hrs: 3 fall or spring.

**Beh Sci 220. Behavioral Science Applications to Leadership—Phase I** ½(1)

Phase I of the interdisciplinary study of behavioral science applications to leadership roles. Both organizational and small group dynamics are examined as sources of influence on the leader and the led. This includes an in-depth analysis of both the leader's role in managing human resources and as a decision maker. Topical military problems are considered in the light of contemporary leadership principles and behavioral theory. Final exam. Prereq: Beh Sci 110 (211); 3/C standing. Sem hrs: 1½ fall or spring.

**Beh Sci 330. Behavioral Science Applications to Leadership—Phase II** ½(1)

Phase II of the interdisciplinary study of behavioral science applications to leadership roles. Primary emphasis is placed on identifying and developing leadership behaviors involved in personal interactions between the leader and subordinates. Counseling techniques are studied to include: skill acquisition in the major approaches to counseling, the leader's role as a motivator of individual behavior, and professional military concerns in the interaction process. Topical military problems are considered in the light of current behavioral science knowledge. Final exam. Prereq: Beh Sci 220; 2/C standing. Sem hrs: 1½ fall or spring.

**Beh Sci 331. Statistical Tests and Measurements** 1(2)

An introduction to the general area of measurement in the behavioral sciences and training with emphasis on the theory and techniques for assessing human performance, achievement, aptitudes, attitudes, abilities, and values. Specific emphasis is placed on the concepts of validity, reliability, and appropriate hypothesis testing schemes for human behavioral data. Final exam. Prereq: Beh Sci 110. Sem hrs: 3 fall or spring.

**Beh Sci 350. Psychobiology** 1(1)

Examines the neurophysiological bases of human and animal behavior. Emphasis is given to central nervous system mechanisms which mediate processes such as learning, intelligence, motivation, perception and emotional behavior. Relates human performance to controls design, arrangement and allocation of system function to man and machines, console design, work space layout and other human factors concerns. Lab. Final exam. Prereq: Bio Sci 110; Beh Sci 110. Sem hrs: 3 spring.

**Beh Sci 351. Cultural Anthropology** 1(1)

The study of man from the perceptives of physical and cultural evolutions. Emphasis is on examining the casual factors underlying man's varied cultural adaptations such as his language, subsistence patterns, family structures, political systems, arts and religions. Final exam. Sem hrs: 3 fall.

**Beh Sci 352. Social Psychology** 1(1)

Investigates interactional forces between groups and the individual in society. Examines effects of diverse social and psychological pressures such as public opinion and propaganda on the individual and groups. Emphasis is placed on attitude formation, and attitude change, aggression and conformity. Final exam. Prereq: Beh Sci 110. Sem hrs: 3 fall or spring.

**Beh Sci 360. Sociology** 1(1)

Scientific study of the influence of group life on human behavior. Topics of interest are social order, culture, socialization, deviance, stratification, intergroup relations and social change. Most emphasis is on how these factors affect military and civilian attitudes and values. Final exam. Sem hrs: 3 spring.

**Beh Sci 372. Experimental Psychology** 1(2)

Experimental design and psychological research methods with special application to Air Force problems of human behavior. Considers major experimental methods and principles used in solution and analysis of problems related to psychological research. Lab. Individual research project. Prereq: Beh Sci 110; department permission. Sem hrs: 3 spring.

**Beh Sci 380. Psychology of Individual Behavior** 1(1)

Investigates factors pertaining to individual human adjustment. Examines the influences and determinants of personality and the major theoretical systems of understanding personality. Reviews assessment and intervention techniques. Evaluates effective and ineffective adjustment patterns in response to stress. Emphasis is on understanding individual behavior in terms of current theory and research findings and on acquiring useful information about adjustment skills and problems. Final exam. Prereq: Beh Sci 110. Sem hrs: 3 fall.

**Beh Sci 390. The Military in Evolving Society** 1(1)

Examines the problems the military officer faces in successfully fulfilling dual roles as an officer and as a member of American society. Problems resulting from the changing role of the military in American society, areas of difference and similarity in military and civilian life, officer professionalism and civil-military relations are seen through a sociological perspective. Problem oriented research paper and briefing. Sem hrs: 3 spring.

**Beh Sci 435. Learning** 1(2)

Investigation of the learning process to include basic principles of learning and critical examination of learning theories. Emphasis on learning research methodology and evaluation of research on learning principles. Current applications of research and theories are reviewed. Lab. Individual research project. Prereq: Beh Sci 110; department permission. Sem hrs: 3 fall or spring.

**Beh Sci 464. Organizational Behavior & Development** 1(2)

Focuses on variables relevant to understanding behavior and change in complex organizations. Concentrates on the impact of organization processes, design, and technology on organization effectiveness. Emphasizes techniques used for organizational development (OD) in private and public sectors. Exercises to become familiar with some of OD techniques are conducted at the individual, team, and section participation level. A review of the literature or completion of individual research project is required. Sem hrs: 3 fall or spring.

**Beh Sci 470. Human Factors Engineering** 1(2)

Survey of human factors in engineering with particular reference to complex man-machine systems. Consideration is given to human abilities and limitations in relation to design, development and evaluation of work environments and aerospace systems. Applications of unique experimental designs and quantitative techniques to systems analyses are introduced. Lab. Individual research paper. Field trips. Prereq: Beh Sci 110; department permission. Sem hrs: 3 spring.

**Beh Sci 477. Industrial and Organizational Psychology** 1(1)

A systematic study of human behavior in the world of work. Examines selection, evaluation and training as

aspects of personal psychology. Covers leadership, motivation, and organizational theory as components of organizational psychology, engineering psychology and the conditions, hazards, and elements of work place. Reviews of several articles and personal job-skills inventory are required. Final exam. Sem hrs: 3 fall or spring.

**Beh Sci 490. Counseling** 1(1)

Introduces student to the nature and goals of counseling. Examines the counseling relationship and the counseling process in the military environment; develops the main approaches to counseling and the theories and strategies of differing counselors. Seminar on selected issues such as professionalism, ethics and the military officer as a counselor. Practicum and mini-labs will be used to demonstrate and develop personal interactive skills as a counselor and officer. Field trip. Final exam. Prereq: Beh Sci 330. Sem hrs: 3 fall or spring.

**Beh Sci 495. Special Topics** 1(1)

Selected topics in behavioral science. Fall 1980 offering: Marriage and the family; Spring offerings: Topics in human factors engineering and contemporary issues in behavioral sciences. Final exam or final report. Prereq: department permission. Sem hrs: 3 fall or spring.

**Beh Sci 499. Independent Study** 1(0)

Independent research or practicum in a specific area of behavioral science. Conducted on a tutorial basis. Term paper. Prereq: 1/C standing; department permission. Sem hrs: 3 fall or spring.

## Biological Sciences (Bio Sci)

*Offered by the Department of Chemistry and Biological Sciences*

**Bio Sci 110. Aerospace Physiology** ½(1)

Classroom studies in the basic physiological functions of man's body systems. Topics include the responses of the human organism as it reacts to stresses of various environments. Honors sections are offered which include laboratory exercises in human physiology. Final exam. Sem hrs: 1½ fall or spring.

**Bio Sci 330. Introduction to Biological Sciences** 1(2)

An introduction to the basic concepts and vocabulary of modern biology. Special emphasis on fundamentals of cellular anatomy, bio-energetics, genetics, molecular biology, ecology, evolution, aging, and reproduction. Demonstration and student participation laboratories. Final exam. Sem hrs: 3 fall or spring.

**Bio Sci 331. Botany and Zoology** 1(2)

Continued introduction to fundamentals of biology with emphasis on plant and animal toxonomy, anatomy, physiology, nutritive and poisonous plants, and parasitic diseases pertaining to the global preparedness of an Air Force officer. Demonstration and student participation laboratories including dissection, microscopic analysis, and field trips. Final exam. Prereq: Completed or enrolled in Bio Sci 330. Sem hrs: 3 fall or spring.

**Bio Sci 363. Genetics** 1(1)

Study of the basic mechanisms and patterns of inheritance and their implications for the individual and society. Discusses the interrelationships of hereditary and environmental effects on the growth and development of individuals and populations. Final exam. Sem hrs: 3 fall or spring.

**Bio Sci 380. Bioenvironmental Science** 1(1)

Fundamental ecological interrelationships between organisms and their environments, including energy flow in ecosystems, biogeochemical cycling, and population dynamics. Emphasis on how man's activities (agriculture, forestry, wildlife management, urban development, mineral and energy extraction, and air and water pollution) affect major biomes such as deserts, prairies, forests, lakes, and oceans. Discusses environmental threats due to man's impact on nature. Final exam. Sem hrs: 3 fall or spring.

**Bio Sci 381. Advanced Bioenvironmental Science** 1(1)

A study of the biological aspects of environmental issues that are of special interest to Air Force personnel. Topics include relevant aspects of theoretical and applied ecology, an overview of the roles performed by various environmental practitioner professions, and studies of the physiological stresses imposed by the hazardous substances and processes inherent in technology. Instrumentation employed in the biological aspects of environmental monitoring and research are demonstrated. Several Air Force case histories dealing with the management of environmental problems are examined. Final exam. Prereq: Bio Sci 380 or department permission. Sem hrs: 3 fall or spring.

**Bio Sci. 383. Human Anatomy** 1(2)

Lecture and laboratory studies of detailed human anatomy with special emphasis on the following organ systems: integumentary, skeletal, muscular, nervous, circulatory, digestive, respiratory, urinary, reproductive, and endocrine systems. Final exam. Prereq: Bio Sci 330 or department permission. Sem hrs: 3 fall or spring.

**Bio Sci 420. Biokinetics** 1(1)

In-depth lecture and seminar studies of the human organism in motion in terms of anatomical, physiological, and mechanical principles with special emphasis given to the effects of structure upon movement. The biomechanical aspects of force, leverage, and impetus are explored in a variety of neuromuscular skills. Final exam. Prereq: Bio Sci 383 or concurrent enrollment. Sem hrs: 3 fall or spring.

**Bio Sci 431. Microbiology** 1(2)

Lecture and laboratory studies of bacteria, viruses, and fungi common to our environment. Systematic identification and physiology of microbial species are emphasized. Final exam. Sem hrs: 3 fall or spring.

**Bio Sci 445. Environmental Physiology** 1(1)

The physiological adaptations of man and other life forms to natural, artificial, and stressed environments. Emphasis on mechanisms of physiological adaptation and biochemical actions. Final exam. Prereq: Bio Sci 330. Sem hrs: 3 fall or spring.

**Bio Sci 447. Physiology** 1(2)
Lecture and laboratory study of human physiology. Areas to be covered include homeostasis, acclimatization to multiple stresses, nervous and endocrine control, special senses, and digestion. The system concept is used. Final exam. Prereq: Bio Sci 383 or concurrent enrollment. Sem hrs: 3 fall or spring.

**Bio Sci 460. Cell and Molecular Biology** 1(1)
Correlates the ultrastructure and functions of cellular organelles with the homeostatic roles of organs and organ systems. Special emphasis on immunology, virology and pathogenic mechanisms. Final paper. Prereq: Department permission. Sem hrs: 3 spring.

**Bio Sci 495. Special Topics** 1(1)
Selected topics in the biological sciences. Final exam or final report. Prereq: Department permission. Sem hrs and offering times determined by department (not more than 3 sem hrs).

**Bio Sci 499. Independent Study** 1(0)
Individual research in the biological sciences under the direction of a faculty member. Emphasizes the use of laboratory facilities. Research report. Prereq: Bio Sci 330; department permission. Sem hrs; 3 fall or spring.

## Chemistry (Chem)

*Offered by the Department of Chemistry and Biological Sciences*

**Chem 101-102. General Chemistry** 1-1(2-2)
Atomic structure and its relation to chemical bonding, structure and periodic law concepts. Solution chemistry including acid-base theory, equilibria, and electrochemistry. Introduction to chemical kinetics, organic chemistry, qualitative analysis and thermochemistry. Laboratory experiments in chemical principles and processes. Final exam both semesters. Must be taken sequentially. Sem hrs: Chem 101—3 fall; Chem 102—3 spring.

**Chem 121-122. Principles of Chemistry** 1-1(2-2)
Atomic, molecular, and crystalline structure. States of matter. Chemical bonding. Equilibria and kinetics of chemical processes. Solution chemistry including acid-base theory, oxidation-reduction reactions, ionic equilibria, and electrochemistry. Properties of selected elements and their compounds. Introduction to chemical thermodynamics, qualitative analysis, and organic chemistry. Laboratory experiments in chemical principles and processes. Students are selected by the department based on placement examination scores. Final exam both semesters. Must be taken sequentially. Sem hrs: Chem 121—3 fall; Chem 122—3 spring.

**Chem 151. Accelerated General Chemistry** 1(2)
Atomic structure, electron orbitals and their relationship to chemical bonding and chemical reactions. Gas equilibria and acid-base theory. Behavior of gases and atmospheric pollution. Thermochemistry including electrochemical cells and energy sources. Solution equilibria and applications to water pollution. Kinetics and nuclear decay. Introduction to organic chemistry, spectroscopy, chemistry of pesticides, and selected drugs. No laboratory experiments. Students are chosen by the department on placement examination scores. Successful completion fulfills requirements for Chem 101-102. Final exam. Sem hrs: 3 fall plus 3 sem hrs validation credit for Chem 122.

**Chem 222. Analytical Chemistry** 1(2)
Laboratory instruction in classical and modern analytical measurements, supplemented with lectures which emphasize the principles involved in the laboratory. Final exam. Prereq: Chem 102, 122 or 151. Sem hrs: 3 fall or spring.

**Chem 233. Organic Chemistry I** 1(1)
Classification and naming of organic compounds, synthesis and reactions of organic functional groups, stereochemistry, introduction to resonance, spectroscopy, and reaction mechanisms. Final exam. Prereq: Chem 102, 122 or 151; concurrent enrollment in Chem 243 is recommended but is optional for non-chemistry majors. Sem hrs: 3 fall.

**Chem 234. Organic Chemistry II** 1(1)
Continuation of the reactions of aliphatic and aromatic compounds and reaction mechanisms. Introduction to carbohydrates, polynuclear aromatics, heterocyclic compounds, amino acids and proteins, and multi-step syntheses. Final exam. Prereq: Chem 233; concurrent enrollment in Chem 244 is recommended but is optional except accredited track for chemistry majors. Sem hrs: 3 spring.

**Chem 243. Organic Chemistry I Lab** 1(2)
Experiments in the preparation, purification, and identification of representative organic compounds. Introduction to vapor phase chromatography and infrared spectroscopy as applied to the identification of organic compounds. Final exam. Prereq: Completed or enrolled in Chem 233. Sem hrs: 3 fall.

**Chem 244. Organic Chemistry II Lab** 1(2)
Experiments in qualitative organic analysis. Introduction to nuclear magnetic resonance spectroscopy. Preparation, purification and identification of aromatic compounds, utilizing organic name reactions. Final exam. Prereq: Chem 243; completed or enrolled in Chem 234. Sem hrs: 3 spring.

**Chem 335. Physical Chemistry I** 1(1)
Chemical thermodynamics and equilibria; properties of gases, liquids, and solutions; phase equilibria; elec-

trochemistry. Final exam. Prereq: Chem 102, 122 or 151; completion of any core math sequence. Sem hrs: 3 fall.

**Chem 336. Physical Chemistry II** 1(1)
Chemical kinetics, surface chemistry, ionic equilibria, introduction to quantum theory, molecular structure, and spectroscopy. Final exam. Prereq: Chem 335. Sem hrs: 3 spring.

**Chem 345. Physical Chemistry I Lab** 1(2)
Laboratory measurement of physical properties and processes including molecular weight determinations; thermodynamics of liquids and gases; thermochemistry of reactions and solutions; phase equilibria; homogeneous and heterogeneous chemical equilibria; colligative properties. Precision of measurement, statistical treatment of data and graphical techniques are emphasized. Final exam. Prereq: Completed or enrolled in Chem 335. Sem hrs: 3 fall.

**Chem 346. Physical Chemistry II Lab** 1(2)
Laboratory experiments in atomic and molecular properties, surface and transport phenomena; chemical kinetics; spectroscopy; radiochemical tracer techniques; high vacuum techniques. The use of modern instrumentation, the independent design and operation of experiments and technical accuracy are emphasized. Final exam. Prereq: Chem 345; completed or enrolled in Chem 336. Sem hrs: 3 spring.

**Chem 381. Chemistry of the Environment** 1(1)
Discussion of the nature, chemistry and alteration of the environment. Major areas of study include atmospheric and water pollution, waste disposal, geochemistry, energy alternatives, and special topics of current or regional interest. Emphasis placed on understanding the chemical principles and reactions involved in protecting and improving our environment. Includes one-half day field trips. Final exam and report. Prereq: 1/C or 2/C standing. Sem hrs: 3 spring.

**Chem 431. Theoretical Inorganic Chemistry** 1(1)
Theoretical approach to atomic structure, covalent bonding and molecular structure; ionic compounds; oxidation potentials; acid-base theories; non-aqueous solvents; coordination chemistry; general survey of the periodic table. Final exam. Prereq: Chem 336. Sem hrs: 3 fall.

**Chem 432. Systematic Inorganic Chemistry** 1(1)
Applications of Chem 431 with emphasis on a systematic study of the behavior of chemical elements and their inorganic compounds. Chemistry of transition metals, organometallics, boron, bio-inorganics, fluxional molecules, kinetics and mechanisms of inorganic reactions, and special topics. Final exam. Prereq: Chem 431. Sem hrs: 3 spring.

**Chem 433. Advanced Organic Chemistry** 1(1)
Structure of organic compounds including resonance, aromaticity, stereochemistry, conformation, and reactive intermediates. The relationship between structure and reactivity. Photochemistry. A discussion of reaction mechanisms and the means by which they are determined. Final exam. Prereq: Chem 234; Chem 336 or department permission. Sem hrs: 3 fall.

**Chem 434. Biochemistry** 1(1)
Chemistry of life processes including comparative biochemistry; chemical nature of biomolecules (carbohydrates, lipids, amino acids and proteins, nucleic acids and their components); energetics and metabolic control; enzymes; mechanisms and kinetics; intermediary metabolism; metabolism of nucleic acids and nitrogen containing compounds; biosynthesis and function of macromolecules including DNA, RNA, and proteins. Final exam. Prereq: Chem 234; Chem 336 or department permission. Sem hrs: 3 spring.

**Chem 435. Advanced Physical Chemistry** 1(1)
Classical chemical thermodynamics. Extension of basic principles to real systems. Topics treated include gases, electrolytic and non-electrolytic solutions, surface systems, and galvanic cells. Final exam. Prereq: Math 351 recommended but not required; Chem 336. Sem hrs: 3 fall.

**Chem 453. Instrumental Chemistry** 1(2)
Advanced theory and use of modern analytical and research instruments. Subjects include spectroscopy, ultraviolet-visible emission and absorption, infrared, and nuclear magnetic resonance; x-ray; mass spectrometry; gas chromatography and electrochemical techniques. Emphasis on theory as applied in laboratory instrumentation. Final exam. Prereq: Chem 336. Sem hrs: 3 fall.

**Chem 495. Special Topics** 1(1)
Selected topics in chemistry. Final exam or final report. Prereq: Departmental permission. Sem hrs and offering time determined by department (not more than 3 sem hrs).

**Chem 499. Independent Study** 1(0)
Individual research under the direction of a faculty member. Includes use of chemical literature. No final. Prereq: Chem 244 and 345; department permission. Sem hrs: 3 fall or spring.

## Civil Engineering (Civ Engr)

*Offered by the Department of Civil Engineering*

**Civ Engr 361. Fundamental Hydraulics** 1(1)
Application of the principles of incompressible fluid mechanics. Fluid properties, manometry, forces on submerged bodies, open channel flow, and conduit flow to include impulse momentum and energy are discussed. Special topics include dynamic similitude, turbomachinery, and the method of Hardy-Cross for balancing flows in water distribution systems and storm sewer design. Final exam. Prereq: Engr 110. Sem hrs: 3 fall.

**Civ Engr 372. Behavior and Analysis of Structures** 1(1)
Introduction to design concepts. Behavior and analysis of statically determinate beams, frames and trusses due to various loadings and deflections. Approximate

analysis of indeterminate structures. Displacement calculations by moment area and virtual work methods. Analysis of indeterminate structures by consistent deformations, moment distribution and matrix techniques. Final exam. Prereq: Mech 210. Sem hrs: 3 spring.

**Civ Engr 381. Engineering Measurements and Construction** 1(2)

Plane surveying and use of basic equipment including chain, level and transit. Field problems in measurement of distance, leveling, line direction and angle measurement. Construction as an industry, construction methods, equipment, materials and management techniques. The professional practice of engineering. Final exam. Sem hrs: 3 fall.

**Civ Engr 392. Soil Mechanics** 1(2)

Engineering properties of soils and shear strength of cohesive and cohesionless soils, consolidation of soils and settlement of structures; stress distribution; lateral earth pressures on structures; ultimate bearing capacity; principles of foundation design. Selected laboratory exercises in soil testing. Final exam. Prereq: Mech 210. Sem hrs: 3 spring.

**Civ Engr 454. Structural Dynamics** 1(1)

Behavior of construction materials and structural members under dynamic loadings. Response of single- and multi-degree-of-freedom systems with emphasis on numerical methods of analysis. Modeling of continuous structures as discrete systems. Design of structures for dynamic loads produced by ground motions and air pressure. Final exam. Prereq: Civ Engr 471, Mech 320; completed or enrolled in Math 351. Sem hrs: 3 spring.

**Civ Engr 461, Solar Energy Applications** 1(1)

Fundamentals of solar energy utilization. Topics include all forms of solar energy; heating and cooling demands for conventional structures; typical energy conservation techniques; systems required for interfacing the available energy with the energy demand; and refinements necessary to make systems efficient and cost effective. Emphasis in course is toward the use of solar energy to supply energy demands. Final report. Prereq: Department permission, enrolled in or completed English 330. Sem hrs: 3 fall.

**Civ Engr 462. Water Supply and Waste Disposal** 1(1)

Design of systems for treatment of water and wastewater, discussion of water pollution parameters, and introduction to water supply problems. Major pollution parameters are discussed and analysis techniques are demonstrated in class. The unit operations approach is used to present procedures for removing various pollutants from water and wastewater. Final exam. Prereq: Civ Engr 361. Sem hrs: 3 spring.

**Civ Engr 463. Applied Wastewater Engineering** 1(2)

Fundamentals of aquatic ecology and the natural cycles of the biosphere are reviewed with special emphasis placed on receiving stream management and the design of sewage treatment plants. Special topics include wastewater toxicity, receiving stream waste assimilative capacity, stream and effluent standards, aeration, activated sludge, aerated lagoons, waste stabilization ponds and anaerobic sludge digestion. Final report. Prereq: Civ Engr 462. Sem hrs: 3 fall.

**Civ Engr 464. Civil Engineering Design** 1(2)

Individual or group design of civil engineering projects in the areas of structural, soils and environmental engineering design. Individual laboratory, experimental or analytic investigation in support of civil engineering design. Specialized topics in structural steel design, reinforced concrete design, structural dynamics, soil dynamics, aerospace facilities design, environmental quality control design, architectural design, and air base master planning may be studied. Students are individually supervised but must formulate their own investigation techniques and conclusions. Final report. Prereq: 1/C standing; engineering or science major; department permission. Sem hrs: 3 fall or spring.

**Civ Engr 471. Behavior and Design of Concrete Members** 1(1)

Material properties of concrete, including mix design and testing of hardened concrete. Behavior and ultimate strength design of reinforced concrete structural elements such as beams, footings, columns and slabs. Flexure, shear, tensile, compressive, anchorage, bond and creep and temperature change stresses are included in design problems. Final exam. Prereq: Civ Engr 372. Sem hrs: 3 fall.

**Civ Engr 472. Behavior and Design of Steel Members** 1(1)

Behavior and working stress design of structural steel elements including tension, flexural and compression members. Design of riveted, bolted and welded steel connections for beams, columns and frames. Introduction to plastic design of beams and frames. Final exam. Prereq: Civ Engr 372. Sem hrs: 3 fall.

**Civ Engr 473. Structural Design** 1(2)

Design a complete, multi-story steel and reinforced concrete building, including structural frame, floor system, wall system and foundation. Determination of design loads on multi-story structures. Use of digital computer for determination of internal forces due to design loads. Final report. Prereq: Civ Engr 372; Civ Engr 471; Civ Engr 472. Sem hrs: 3 spring.

**Civ Engr 481. Air Base Engineering** 1(2)

Principles of planning, land use regulatory measures, design considerations for airport and aviation system facilities emphasizing the interface of the aviation system with the urban and natural environment. The viewpoint of the base commander is stressed. Technical inputs for base commander's analysis are handled by computer software. Topics include airspace criteria, geometric design of airfield, zoning, noise abatement, and pollution control. Final exam. Sem hrs: 3 spring.

**Civ Engr 491. Foundation Engineering** 1(1)

Effects of sub-soil conditions and the behavior of soils on foundation types. Analysis and design of footings, pile foundations, retaining walls, piers, abutments, sheet piling, and slope stability. Final exam. Prereq: Civ Engr 392. Sem hrs: 3 fall.

**Civ Engr 495. Special Topics** 1(1)
Selected topics in civil engineering. Final exam or final report. Prereq: Department permission. Sem hrs and offering time determined by department (not more than 3 sem hrs).

**Civ Engr 499. Independent Study** 1(0)
Individual study and research in an advanced civil engineering topic approved by the department head. Final report. Sem hrs: 3 fall or spring.


## Computer Science (Comp Sci)

*Offered by the Department of Astronautics and Computer Science*

**Comp Sci 100. Introduction to Computer Science** 1(2)
Introduction to algorithms, programs and computers. Principles and concepts designed to provide the basic knowledge and experience necessary to use computers effectively to solve problems. Problem analysis and preparation and execution of numerical and non-numerical programs for computer solution. Final exam. Sem hrs: 3 fall or spring.

**Comp Sci 351. Computer System Organization** 1(1)
Expands on basic computer logic systems by introducing and contrasting major types of computing system organizations. Treats instruction formats, languages, operating systems, and input/output within micro, mini, and maxi computer organizations. Final exam. Prereq: Comp Sci 100 (200). Sem hrs: 3 fall.

**Comp Sci 356. Computer Architecture and Performance Evaluation** 1(1)
Design and evaluate computer systems for specific applications. This course examines the various application areas, system hardware units, and system software capabilities. Computer performance design and evaluation techniques are then used to match the proper computer system to the application. Final project. Prereq: Comp Sci 351. Sem hrs: 3 spring.

**Comp Sci 362. Computer Simulation** 1(1)
Theory of system modeling and computer simulation; simulation languages; queuing theory. Includes preparation of several computer programs and a group study of a real world problem. Final report. Prereq: Math 357 or Math 220 with department permission; Comp Sci 100 (200). Sem hrs: 3 fall or spring.

**Comp Sci 380. Software Engineering Fundamentals** 1(1)
Basic concepts of data; description, representation, and manipulation of data structures; basic business data processing operations using strings, lists, inverted lists, and trees; file organization; data structures in programming languages; introduction to data management systems. Computer programs preparation and execution. Final project. Prereq: Comp Sci 100; or department permission. Sem hrs: 3 fall or spring.

**Comp Sci 453. Design I** 1(1)
First course of a two semester sequence which is the "capstone" for computer science. Study of the development of user requirements, workload and systems analysis, and the generation of the necessary management space and approval documents required for successful implementation of computer hardware and software resources. Begins study of the life cycle process to include budget process, site preparation, selection of system architectures and software capabilities, and facility management. Approval concepts are embodied in a term project. Final project. Prereq: Comp Sci 356, 380. Sem hrs: 3 fall.

**Comp Sci 454. Design II** 1(1)
This is the second course in a two semester sequence which is the "capstone" of computer science. A continuation of the study of computer systems definition and implementation. Concludes the study of the life cycle process to include management concepts, and software development and management. The design, coding, testing, and implementation of a significant software module is included in the term project with emphasis on documentation requirements and standards. Final project. Prereq: Comp Sci 453. Sem hrs: 3 spring.

**Comp Sci 463. Data Base Management** 1(1)
Basic concepts of Data Base Management and Data Base Management Systems (DBMS). Introduction to CODASYL terminology; techniques of data base design and manipulation using data definition, host interface, and self contained inquiry languages; system analysis of current DBMS systems; computer program preparation and execution of a Data Base Management problem using a DBMS. Final project. Prereq: Comp Sci 380, 1/C standing or department permission. Sem hrs: 3 spring.

**Comp Sci 467. Computer Networks and Communication** 1(1)
Design and use of computer networks. Examines the field of communications technology through satellite communications. Design of both computer and terminal networks is emphasized. Also treats distributed data bases, distributed operating systems, and Air Force applications. Final project. Prereq: Comp Sci 356. Sem hrs: 3 fall.

**Comp Sci 473. Digital Control** 1(1)
Basic concepts surrounding the digital control application area. Examines digital control requirements of processors, input/output, and digital to analog/analog to digital conversion. Includes the study of digital

control sensors and devices, environmental hazards, control programs, digital filters and compensators, and process control. Final project. Prereq: Comp Sci 351. Sem hrs: 3 fall.

**Comp Sci 474. Mini-Micro-Graphics** 1(1)

Basic concepts of mini and microcomputers including internal arithmetic, interval representation of data and instructions, architecture concepts, assembly language programming, cross compiler concepts, I/O programming, and interrupt programming. Includes problems involving real time control processes. Also examines interactive computer graphics including display processing hardware and graphics peripherals. Includes several computer projects. Final project. Prereq: Comp Sci 351. Sem hrs: 3 spring.

**Comp Sci 483. Operating Systems** 1(1)

Design of supervisors for large multiprocessing systems. Topics include virtual memory, resource management and allocation, concurrent processes, protection, file systems, batch and interactive subsystems. Final report. Prereq: Comp Sci 351. Sem hrs: 3 fall.

**Comp Sci 484. Programming Systems** 1(1)

Translators and interpreters for high-level programming languages. Program organization, grammars, scanners and recognizers. Design and construction of a syntax-directed compiler. Final report. Prereq: Comp Sci 381 or Comp Sci 351. Sem hrs: 3 spring.

**Comp Sci 495. Special Topics** 1(1)

Selected topics in computer science. Final exam or final report. Prereq: Department permission. Sem hrs and offering time determined by department (not more than 3 sem hrs).

**Comp Sci 499. Independent Study** 1(0)

Individual study and research supervised by a faculty member. Topic established with the department head. Final report. Sem hrs: 3 fall or spring.

## Economics (Econ)

*Offered by the Department of Economics, Geography and Management*

**Econ 221. Economics of National Security** 1(1)

Introduction of microeconomic theory and analysis of economic problems that bear upon national security. The principles of microeconomics are applied to national defense decision making. An honors section of greater depth is offered. Final exam. Sem hrs: 3 fall or spring.

**Econ 222. Principles of Economics** ½(1)

Introduction to the economic principles underlying the operation of the mixed enterprise economy of the United States. Includes macroeconomic analysis of national income determination and stabilization policies. An honors section of greater depth is offered. Final exam. Prereq: Econ 221. Sem hrs: 1½ fall or spring.

**Econ 302. Foundations of Economic Theory.** 0(1x)

Review and synthesis of economic theory and principles in preparation for tests of achievement in economics. Sem. hrs: 3 spring.

**Econ 333. Price Theory** 1(1)

Traditional microeconomic theory emphasizing the principles of product and factor pricing, allocation and employment of resources, and the implications of varying market structures. Investigates the usefulness of price theory in decision making. Final exam. Prereq: Econ 221 (222). Sem hrs: 3 fall or spring.

**Econ 351. Comparative Economic Systems** 1(1)

Examines the history, theory, and operation of economic systems. Addresses economic system classification criteria, evaluation criteria, normative models, and the motivation and functioning of economic systems in the modern world. Emphasis systemic approaches to the solution of economic problems associated with coordination, planning, income distribution, growth performance, resource application, trade, transportation, agriculture and industrialization. Places particular emphasis on modern economic systems which claim to be Marxist. Final exam or final report. Prereq: Econ 222. Sem hrs: 3 fall.

**Econ 356. Macroeconomic Theory** 1(1)

Analysis of national income, employment, and price level determination using Keynesian and post-Keynesian models. Examination of the control of aggregate demand through monetary and fiscal policies. The causes, consequences, and policy options associated with inflation and unemployment are studied in depth. Contemporary macroeconomic issues are explored by study of the *Economic Report of the President*. Final exam. Prereq: Econ 222. Sem hrs: 3 spring.

**Econ 374. Survey of International Economic Issues** 1(1)

Examination of current issues in the commercial relations between advanced nations and in the relations between those nations and less-developed countries. Main areas of emphasis include international trade, international payments, economic development, and the multinational enterprise. This course is designed for cadets who are not majoring in either economics or management. Final exam. Prereq: Econ 222. Sem hrs: 3 fall or spring.

**Econ 421. Economic History** 1(1)

An examination of the origin and evolution of modern economic systems. Includes formulation of economic thought, impact of the European Industrial Revolution, and development of American economic institutions. Final exam. Prereq: Econ 222. Sem hrs: 3 fall.

**Econ 422. Labor Economics** 1(1)

Supply and demand for labor; labor markets and mobility; economic aspects of trade unions; wage structure; micro-economic aspects of labor markets. Particular attention is focused on the defense implications of the above subject areas. Final exam. Prereq: Econ 221. Sem hrs: 3 spring.

**Econ 450. International Economics** 1(1)

Economic aspects of international relations. Includes the theory of international trade, relationships between national currencies under alternative international monetary systems, the balance of payments, commercial policy, and economic warfare. Final exam. Prereq: Econ 333. Sem hrs: 3 spring.

**Econ 465. Introduction to Econometrics** 1(1)
Application of statistical tools to economic data. Includes methodology, econometrics model building, and statistical inference. Emphasizes the application of econometric theory to original empirical problems. Final exam. Prereq: Econ 222; Mgt 331, Math 358, or Pol Sci 349 or department permission. Sem hrs: 3 spring.

**Econ 466. Seminar in Econometrics** 1(2)
Continues development of model building and analytical tools and stresses their application to economic problems. Emphasizes individual and original research. Final exam or final report. Prereq: Econ 465. Sem hrs: 3 fall.

**Econ 473. Public Finance** 1(1)
Examination of reasons for governmental intervention in the economic system; the nature of public goods; public sector decision making; principles of taxation; criteria for judging economic efficiency of budget policies; responses of the private sector to fiscal measures; social, political, and historical forces which have formed present fiscal institutions and contemporary fiscal policy; fiscal federalism; aggregate fiscal policy; government regulation. Final exam or final report. Prereq: Econ 333 or department permission. Sem hrs: 3 fall.

**Econ 475. Monetary Economics** 1(1)
Advanced treatment of money in the Keynesian and Monetarist models, with emphasis on both theory and policy issues. Special emphasis is placed on the structure and operation of the Federal Reserve System and the tools of monetary policy. The aggregate financial system, including flow of funds, financial institutions and the level and structure of interest rates, is also explored. Final exam. Prereq: Econ 356 or department permission. Sem hrs: 3 spring.

**Econ 477. Defense Economics** 1(1)
Survey of the economic perspectives of national defense for students not majoring in economics. Emphasis is on institutional and macroeconomic aspects of defense. Topics include the Economic Impact of the Defense Sector. The Burden of National Defense, Defense and American Industry, and How Much Defense Spending is Enough? Several guest speakers. Final exam. Prereq: Econ 222. Sem hrs: 3 fall.

**Econ 478. Seminar in Defense Economics** 1(2)
An advanced course in economic analysis. Applies macroeconomic and microeconomic theory to issues of major concern to defense policy makers. Individual research into a sub-field of defense economics is required. Final exam or final report. Prereq: Econ 333, Econ 356 and Econ 465, or department permission. Sem hrs: 3 spring.

**Econ 495. Special Topics** 1(2)
Selected topics in economics of either an advanced treatment or general interest orientation. Prospective future offerings include Seminar in Macroeconomic Modeling, Great Books in Economics, Mathematical Economics, and Contemporary Issues in Economics. Final exam or final report. Sem hrs: 3 fall or spring.

**Econ 499. Independent Study** 1(0)
Tutorial investigation of a specific area of economics. Final report. Sem hrs: 3 fall or spring.

## Electrical Engineering (El Engr)

*Offered by the Department of Electrical Engineering*

**El Engr 210. Digital Signals and Systems** 1(1)
An introduction to the principles of logic design. Includes Boolean algebra, combinational and sequential logic networks with basic design and analysis techniques, and an introduction to digital processing systems. Laboratory projects include the analysis and design of combinational and sequential networks and the analysis of integrated circuits as applied to digital computer architecture. Lab. Final exam. Prereq: Math 132. Sem hrs: 3 fall or spring.

**El Engr 310. Electronic Circuits and Systems** 1(1)
An introduction to electronics and electrical circuit theory. Treats traditional topics such as transients, load-line analysis, and biasing as they apply to modern devices such as the integrated circuit operational amplifier. Includes semiconductor physics, electron devices, sinusoidal steady-state analysis, and introductory system theory. Emphasizes continuous as opposed to digital electronic systems. Laboratory projects include work with integrated circuits. Lab. Final exam. Prereq: El Engr 210 and Physics 211. Sem hrs: 3 fall or spring.

**El Engr 340. Circuit Analysis** 1(2)
An introduction to electrical circuit analysis. Emphasizes a balanced treatment of both theoretical and applied analysis techniques. Topics covered include circuit components, connection equations, and device relationships including operation amplifiers. The Laplace transform is introduced and used extensively as an analysis tool. Lab. Final exam. Prereq: Completed or enrolled in El Engr 210 or Math 210. Sem hrs: 3 fall or spring.

**El Engr 341. Electronics I** 1(2)
Introduction to semiconductor electronics. Includes analysis of semiconductor devices such as the diode and transistor. Applications of devices in electronic circuits are covered with emphasis on the diode and transistor. Lab. Final exam. Prereq: El Engr 310 or completed or enrolled in El Engr 340. Sem hrs: 3 fall.

**El Engr 342. Electronics II** 1(2)
A continuation of El Engr 341. Covers the theory and application of semiconductor devices and integrated circuits with emphasis on principles of operation. Lab. Final exam. Prereq: El Engr 341. Sem hrs: 3 spring.

**El Engr 346. Signal and System Analysis** 1(1)
Signal representation in terms of singularity functions and Fourier series. Representation and solution of continuous and discrete systems using classical methods such as convolution and using transform techniques to include fast and discrete Fourier transforms, Z transforms, and Laplace transforms. Laboratory experiments and computer exercises emphasize

both continuous and discrete time concepts. Lab. Final exam. Prereq: El Engr 340; completed or enrolled in Math 330. Sem hrs: 3 fall or spring.

**El Engr 351. Laboratory Techniques** 0(0)

Practical application of electronic test equipment and laboratory techniques. Includes basic electrical measurements. Emphasis on the diode and transistor as circuit elements. Lab. Prereq: Enrolled in El Engr 341. Sem hrs: 1 fall.

**El Engr 352. Electronics Laboratory** 0(0)

Practical application of semiconductor devices and integrated circuits. Emphasis on circuit construction and verification of device parameters. Lab. Prereq: Enrolled in El Engr 342. Sem hrs: 1 spring.

**El Engr 360. Instrumentation Systems** 1(1)

Principles of modern data acquisition and instrumentation systems for non-electrical engineering majors. Includes measurement techniques, transducers, analog and digital data processing systems and displays. Lab. Final exam. Prereq: El Engr 310 or El Engr 340. Sem hrs: 3 fall or spring.

**El Engr 380. Modern Logic Design** 1(2)

An intermediate course in the design of digital systems. Topics include a survey of modern logic families (DTL, RTL, TTL, CMOS), medium scale combinational and sequential circuits, state controllers, microprogramming, and central processor unit design. Lab. Final exam. Prereq: El Engr 210, El Engr 310 or El Engr 340. Sem hrs: 3 fall or spring.

**El Engr 443. Electromagnetics** 1(2)

The study of Maxwell's equations, plane waves, transmission, and radiating systems. Topics include wave propagation, transmission lines, waveguides, and antennas. Lab. Final exam. Prereq: Physics 311; Math 330 or department permission. Sem hrs: 3 fall or spring.

**El Engr 447. Communications Systems** 1(1)

An introduction to modern electrical communications and information transfer from a systems viewpoint. Comparative performance of various modulation and detection methods are analyzed. Coverage includes theory of operation, effects of random noise, bandwidth constraints, and multiplex capabilities of analog transmission systems. Lab. Final exam. Prereq: El Engr 346. Sem hrs: 3 fall.

**El Engr 449. Introduction to Optical Electronics** 1(1)

Shows the commonality of electrical and optical systems by expanding temporal Fourier transformation theory to two dimensional spatial Fourier transforms. Analysis of the basic components of optical communication systems to include sources, channels, receivers, and modulation techniques. Lab. Final exam. Prereq: El Engr 447. Sem hrs: 3 spring.

**El Engr 452. Bioengineering** 1(1)

Application of engineering techniques, particularly those of electrical engineering, to the solution of biomedical engineering problems. Study of selected human physiological systems, e.g., circulatory system and nervous system; review of selected engineering principles; and design of bioinstrumentation devices to monitor physiological events. Design project and final exam. Prereq: El Engr 340 or El Engr 360 or department permission. Sem hrs: 3 fall or spring.

**El Engr 464. Design** 1(1)

The integration of advanced concepts in electronics, instrumentation, signal processing, and microcomputer hardware with production and management methods as practiced in the USAF. Emphasis is placed on developing design techniques for the application of electrical engineering technology to defense problems. Lab. Final report. Prereq: Department permission. Sem hrs: 3 spring.

**El Engr 465. Design Laboratory** 1(0)

The laboratory study of advanced concepts in electrical engineering technology to include metrology, manufacturing techniques, and the completion of a design project. Lab. Final project. Prereq: Enrolled in El Engr 464. Sem hrs: 1 spring.

**El Engr 480. Studies in Military Engineering** 1(1)

An introductory course in military engineering for non-electrical engineering majors. Course highlights systems engineering studies of weapon systems procurement, operation, and maintenance within the Department of Defense. Topics selected from current Air Force systems. Final exam. Prereq: 1/C standing and department permission. Sem hrs: 3 fall or spring.

**El Engr 482. Television Theory and Servicing** 0(1)

Illustrates principles of electronics as they are employed in a home television receiver. Theory includes the make-up of the composite television signal, reception and demodulation, and colorimetry. Laboratory exercises permit students to relate trouble symptoms to a particular section of the receiver. Lab. Prereq: El Engr 341. Sem hrs: 0 spring. (Note: This course carries no semester hours or course unit credit and will not satisfy any graduation requirement. Cadets enrolling must meet the requirements for an overload.)

**El Engr 487. Real-Time Computation** 1(1)

An introduction to real-time computation using a microprocessor-based data acquisition system. Topics include structured system development, microprocessor instruction sets, support software, and hardware-software relationships and techniques. Lab. Final project. Prereq: El Engr 210 and department permission. Sem hrs: 3 fall.

**El Engr 488. Microprocessor Systems** 1(2)

Analysis and design of dedicated microprocessor systems. Includes interfacing, computer architecture, design methodology, and related laboratory techniques. Lab. Final exam. Prereq: El Engr 380; El Engr 487. Sem hrs: 3 spring.

**El Engr 495. Special Topics** 1(1)

Selected topics in electrical engineering. Final project. Prereq: Department permission. Sem hrs and offering time determined by department (not more than 3 sem hrs).

**El Engr 499. Independent Study** 1(0)

Individual study and research in an engineering design topic approved by the department head. Final paper and oral report. Prereq: Department permisssion. Sem hrs: 3 fall or spring.

## Engineering (Engr)

*Offered by various departments and divisions as noted*

**Engr 110: Engineering Fundamentals** 1(2)
Scalar approach to two-dimensional statics and dynamics to include the topics of equilibrium, stress and strain, trusses, bending, kinematics, Newton's second law, work-kinetic energy, and impulse-momentum with emphasis on the solution technique of problems encountered in the engineering sciences. Final exam or final design project. Prereq: Completed or enrolled in Math 132. (Administered by the Department of Civil Engineering.) Sem hrs: 3 fall or spring.

**Engr 350. Linear Systems Analysis and Design** 1(2)
Analysis and design of linear systems. Includes modeling of electrical and mechanical systems; characterization of physical systems using linear, constant-coefficient differential equations; Laplace transform techniques; identification of system response using frequency response and Bode plots; specification of design criteria in the s-domain; and modification of system parameters to satisfy design requirements. Analog computer programming is taught and the analog computer is used for analysis and design. Lab. Final project. Prereq: Physics 211. *(Administered by the Department of Astronautics and Computer Science with instructors from all Engineering Science departments.)* Sem hrs: 3 fall or spring.

**Engr 402. Professional Engineering Development** 0(1)
Review of mathematics, chemistry, physics, and engineering sciences in preparation for the Colorado Engineer-in-Training examination. Taking the exam is optional at end of course. Prereq: 1/C standing; Basic or Engineering Science major. *(Administered by Department of Civil Engineering.* Sem hrs: 0 spring.

**El Engr 430. Engineering Systems Design** 1(1)
Application of the various engineering disciplines to overall systems analysis and design. Includes introduction and application of the Air Force systems acquisition process in completing a design project. Design projects include attention to economic and management aspects of the systems design process. Prereq: Aero 311; Aero 312; Comp Sci 100; El Engr 310/340; Mech 210; Astro 332, if possible. (Administered by the Department of Astronautics and Computer Science with instructors from all Engineering Science Departments). Sem hrs: 3 fall and spring.

**Engr 451. Engineering Applications of Digital Computers** 1(1)
A study of computer oriented methods to solve a wide range of problems in the engineering sciences. Includes numercial integration of ordinary differential equations; matrix methods such as least squares; and computer generation of noise with application to simulation. Instruction in FORTRAN programming. Selected engineering problems solved using FORTRAN on the B6700 computer. Projects may be altered to satisfy the peculiar requirements of the students. Final project. Prereq: 1/C or 2/C standing or departmental permission. (Administered by the Department of Astronautics and Computer Science). Sem hrs: 3 spring.

**Science 499. Summer Research** 0(0)
Observation and participation in advanced research projects with military and civilian agencies working on defense-oriented problems at locations throughout the United States. Final report. Not graded: performance report rendered by research sponsor. *(Administered by the Faculty Secretariat.)* Sem hrs: 4 summer. Fulfills requirement for Mil Tng 400, Summer Leadership Preparation.

## English (English)

*Offered by the Department of English*

**English 001. English as a Second Language** 1(0)
A course for fourth class allied students and other students for whom English is a second language to increase oral and written competencies requisite for completion of English 111 and 212. Pass/Fail grades to be entered on student's transcript. Prereq: Validation credit for foreign language or department permission. No final. Noncredit. Sem hrs: 0 summer, fall and spring.

**English 110: Fundamentals of English** 1(2)
A course for students who need a review of the fundamentals of correct written expression. Frequent written exercises in mechanics are reinforced in the context of the paragraph. Introduction to short essay structure. Successful completion satisfies requirement for English III. Final exam. Sem hrs: 3 fall.

**English 111. English Composition** 1(1)
Reinforcement of basic writing skills and introduction to rhetoric, with frequent practice in expository writing (one-paragraph essays, multi-paragraph essays, and a research paper). Students read examples of thought-provoking prose to reinforce assignments. Honors sectioning for advanced students. Final exam. Sem hrs: 3 fall or spring.

**English 212. Composition and Speech** 1(1)
Combines an intermediate-level continuation of English 111 with basic instruction in public speaking. Emphasizes a laboratory approach with frequent writing exercises and speaking performances. Examines persuasive communications of all types, including advertising and print news. Prereq: English 111. Sem hrs: 3 fall or spring.

**English 330. Technical Writing** 1(1)
A practical course in the communication of technical information, emphasizing the precision of technical writing and its differences from non-technical writing. Students learn to use graphs, tables, and drawings, and to document scientific literature; they also write papers using technical definitions, descriptions of mechanisms and processes, and statistics from their own technical fields of interest. Oral presentations on selected topics teach the techniques of briefing a technical paper. Liaison officers from the science departments assist the student in combining all writing skills in a final scientific major report. Prereq: English 212 (112); Engineering and Basic Science majors; 2/C standing. Sem hrs: 3 fall or spring.

**English 350. Advanced Composition** 1(1)
Practical workshop approach emphasizes professional speaking and writing techniques on academic and military subjects. Frequent written exercises develop necessary skills in audience analysis and effective style, and illustrate fundamentals of proper preparation and execution of advanced writing projects. Liaison officers from the humanities and social sciences assist in a major report project. Prereq: English 212 (112); Humanities and Social Science majors; 2/C standing. Sem hrs: 3 fall or spring.

**English 353. Shakespeare** 1(1)
Intensive study of Shakespeare's poetry and major plays within the cultural and historical perspectives of Renaissance England. Cadets attend a stage production of one play when available. Designed for non-humanities majors as well. Final exam. Prereq: English 111. Sem hrs: 3 fall or spring.

**English 360. Classical Masterpieces: Homer to Milton** 1(1)
A tutorial course which critically examines the sources of English and European literature from its beginnings to the latter half of the seventeenth century. Students read such works as the *Iliod*, *Odyssey*, *Oedipus Tyrannus*, *Genesis*, *Job*, the *Inferno*, *Don Quixote*, and *Porodise Lost* and analyze the distinguishing characteristics of epic and lyric poetry, drama, and prose. The course also introduces the student to the great myths underlying our notions of the heroic and the romantic. Final exam. Prereq: English 111. Sem hrs: 3 fall or spring.

**English 370. Speech** 1(2)
Instruction and practice in public address, including informative, argumentative, and persuasive speaking. Emphasizes a workshop approach with individual coaching; frequent audio and video taping sessions. Open to all cadets. No final. Prereq: English 212 (112). Sem hrs: 3 fall or spring.

**English 406. Values in Literature** 1(1)
Course covers what works of literature reflect about a culture's values. Works from earlier centuries lend historical perspective to novels, plays, poems, and short stories of the twentieth century. Major assignments include a paper (at the discretion of the Department Head) and a creative project on themes from the readings. Certain cadets may be allowed to fulfill the core requirements by taking either Fine Arts 451 or 458 instead of English 406.

**English 461. English Literature I: Beginnings to Romanticism** 1(1)
A survey of English poetry, drama, and prose of such authors as Chaucer, Spenser, Shakespeare, Jonson, Milton, Pope, Defoe, Fielding, Johnson, and Boswell. Final Exam. Prereq: English 111. Sem hrs: 3 fall.

**English 462. English Literature II: Romanticism to the Present** 1(1)
A survey of later English literature focusing on Romantic poetry, Victorian prose and poetry, and the work of the Moderns. Works are by such authors as Byron, Shelley, Austen, Bronte, Dickens, Hardy, Conrad, Tennyson, Browning, Yeats, Lawrence, and Golding. Final exam. Prereq: English 111 (English 461 recommended). Sem hrs: 3 spring.

**English 471. American Literature I: Beginnings to Naturalism** 1(1)
A survey of American fiction, poetry, drama, and prose by such authors as Jefferson, Irving, Poe, Hawthorne, Melville, Whitman, Twain, and Dickinson. Final exam. Prereq: English 111. Sem hrs: 3 fall.

**English 472. American Literature II: Naturalism to the Present** 1(1)
A continuation of the survey of American fiction, poetry, drama, and prose by such writers as Robinson, Eliot, Frost, O'Neill, Fitzgerald, Faulkner, Hemingway, Wright, and selected contemporary authors. Final exam. Prereq: English 111 (English 471 recommended). Sem hrs: 3 spring.

**English 475. Creative Writing** 1(1)
A course in which nonspecialists create poetry, fiction, drama, and other creative forms. Students cultivate their creative interests in a workshop environment and in one-to-one sessions with experienced tutors. Final project: students present their own best work. Prereq: English 111. Sem hrs: 3 fall or spring.

**English 495. Special Topics** 1(1)
Selected topics in English. Previous topics have included Black Literature, Literature of the Supernatural, Science Fiction, and Detective Fiction. Fall 1980 offering: Myth and Metaphor; Sports in American Fiction; Spring 1981 offering: Women in Literature. Final exam. Prereq: English 111. Sem hrs: 3 fall or spring.

**English 499. Independent Study** 1(0)
Study and research in literature or creative writing. Subject and meetings arranged with the instructor. Final report. Prereq: Department permission. Sem hrs: 3 fall or spring.

## Fine Arts (Fine Art)

*Offered by the Department of Philosophy and Fine Arts*

**Fine Art 105, 205, 305, 405. Drum and Bugle Corps** 0(0)
Introduction to military music traditions and procedures. Intersive rehearsal and drill in techniques of precision marching while playing. Instruction and

participation in planning public performances. Cadets in Fine Art 205 and 305 assume responsibilities for section leadership and lower echelons of command. Cadets in Fine Art 405 assume upper echelon leadership and command of corps. Upon withdrawal or completion, cadets will participate in squadron competitive athletics. Pass/Fail. No final. Prereq: Audition and department permission. Sem hrs: 1 fall.

**Fine Art 451. Introduction to the Visual Arts** 1(1)

Discussion and analysis of major art concepts, artists, and styles. Emphasis on development of potential for esthetic and creative experience, including a brief survey of the evolution of art styles and a studio project in painting. Demonstrated artistic ability or prior knowledge of art not required. Field trip to the Denver Art Museum. Final exam. Sem hrs: 3 fall or spring. This course may fulfill English 406 core requirement with permission of the Department Head.

**Fine Art 458. Music Appreciation** 1(1)

Survey of music of the Western world through a study of basic elements, forms, and styles in representative works by major composers. Emphasis on listening, understanding, and appreciation. Voluntary field trips to selected area concerts. Technical knowledge or talent in music not required. Final exam. Sem hrs: 3 fall or spring. This course may fulfill English 406 core requirement with permission of the Department Head.

**Fine Art 460. Fine Arts Studio** 1(2)

Introductory experiences in design, graphics, painting, sculpture, and mass communications. Media explored are woodcuts, etchings, oils, synthetics, wood, stone, bronze, and direct metal. Prior experience in artistic media not required. Field trip to the Denver Art Museum. No final. Prereq: Fine Art 451 or Fine Art 477. Sem hrs: 3 spring.

**Fine Art 477. American Art and Music** 1(1)

Survey from the Colonial period to the present. Considers American aspects of music and art, with reference to visual and aural communication, regional and national means of expression, and the influence of American currents of thought on specific periods and individual styles, including contemporary artists and composers. Technical knowledge or ability in music or art not required. Field trip to the Denver Art Museum. Final exam. Sem hrs: 3 fall.

**Fine Art 495. Special Topics** 1(1)

Selected special topics in Fine Arts. Fall 1980 offering: Oral Interpretation of Literature; Spring 1981 offering: Practice of Drama. Final exam. Sem hrs: 3 fall or spring.

**Fine Art 499. Independent Study** 1(0)

Independent study in the field of art or music. Subject and meetings arranged with the instructor. No final. Prereq: For visual art, Fine Art 451 and Fine Art 460 plus department permission; for music, Fine Art 458 and department permission. Sem hrs: 3 fall or spring.

## Foreign Languages (For Lang)

*Offered by the Department of Foreign Languages*

**Foreign Lang 131-132.**

| | | |
|---|---|---|
| *Arabic 131-132* | *Basic Arabic* | 1-½(2-1) |
| *Chinese 131-132* | *Basic Chinese* | 1-½(2-1) |
| *French 131-132* | *Basic French* | ½-1(1-2) |
| *German 131-132* | *Basic German* | ½-1(1-2) |
| *Japanese 131-132* | *Basic Japanese* | 1-½(2-1) |
| *Russian 131-132* | *Basic Russian* | 1-½(2-1) |
| *Spanish 131-132* | *Basic Spanish* | ½-1(1-2) |

Basic foreign language study with emphasis on communicative skills, drills in grammar and structure. Introduction of aural/reading comprehension and contemporary culture and civilization of language studied. Students are placed in course on basis of placement examination scores. Final exam both semesters. Must be taken sequentially. Sem hrs: For Lang 131—3 or 1½ fall; For Lang 132—1½ or 3 spring. (See Supplemental Information for additional details).

**For Lang 141-142** 1 1½ (2-1)

| | |
|---|---|
| *French 141-142* | *Accelerated Basic French* |
| *German 141-142* | *Accelerated Basic German* |
| *Spanish 141-142* | *Accelerated Basic Spanish* |

Accelerated basic foreign language study with emphasis on communicative skills. Drills in grammar and structure. Introduction of aural/reading comprehension and contemporary culture and civilization of language studied. Students are placed in course on basis of placement examination scores. Final exam both semesters. Must be taken sequentially. Sem hrs: For Lang 141—3 fall; For Lang 142—1½ spring. (See Supplemental Information for additional details).

**For Lang 221.** 1(1)

*Arabic 221* *Intermediate Arabic I*
*Chinese 221* *Intermediate Chinese I*
*French 221* *Intermediate French I*
*German 221* *Intermediate German I*
*Japanese 221* *Intermediate Japanese I*
*Russian 221* *Intermediate Russian I*
*Spanish 221* *Intermediate Spanish I*

Review of grammar and structure of target language with emphasis on grammatical and syntactical accuracy in both speech and writing. Intensification of aural and reading comprehension. Student talks and classroom discussions based on selected readings in culture and civilization of language studied. Language laboratory supplements classroom instruction. Final exam. Prereq: Successful completion of For Lang 132 or 142 (102) (122) (151), or department permission. Sem hrs: 3 fall. (French 221 will be offered both fall and spring.)

**For Lang 222.** 1(1)

*Arabic 222* *Intermediate Arabic II*
*Chinese 222* *Intermediate Chinese II*
*French 222* *Intermediate French II*
*German 222* *Intermediate German II*
*Japanese 222* *Intermediate Japanese II*
*Russian 222* *Intermediate Russian II*
*Spanish 222* *Intermediate Spanish II*

Continuation of essential elements of language structure. Emphasis on conversational practice and aural comprehension of contemporary spoken language. Student talks and classroom discussions based on culture and civilization readings/topics in target language. Language laboratory supplements classroom instruction. Final exam. Prereq: successful completion of For Lang 115 or 221 (253) or department permission. Sem hrs: 3 spring. (French 222 will be offered both fall and spring.)

**For Lang 223.** 1(1)

*Arabic 223* *Intermediate Arabic III*
*Chinese 223* *Intermediate Chinese III*
*French 223* *Intermediate French III*
*German 223* *Intermediate German III*
*Japanese 223* *Intermediate Japanese III*
*Russian 223* *Intermediate Russian III*
*Spanish 223* *Intermediate Spanish III*

Continuation of essential elements of language structure. Emphasis on reading comprehension/translation based on scientific and social science reading materials in contemporary target language. Intensification of grammatical syntactical accuracy in writing. Course is designed to develop a facility for using language studied as a research tool. Final exam. Prereq: Successful completion of For Lang 222 (254) or department permission. Sem hrs: 3 fall or spring.

**For Lang 365.** 1(1)

*French 365* *Advanced French*
*German 365* *Advanced German*
*Russian 365* *Advanced Russian*
*Spanish 365* *Advanced Spanish*

Oral discussion of issues in the civilization and culture of the country or countries concerned based on selected readings in the target language. Final exam. Prereq: Successful completion of For Lang 223 (255) or department permission. Sem hrs: 3 fall or spring.

**For Lang 376.** 1(1)

*French 376* *Contemporary Literature*
*German 376* *Contemporary Literature*
*Spanish 376* *Contemporary Literature*

Study of important writers, their works, and influences on their societies. Final exam. Prereq: For Lang 365 or department permission. Sem hrs: 3 fall or spring.

**For Lang 491.** 1(1)

*French 491* *French AFA Preparation I*

Intensive program in French for prospective candidates for the French Air Force Academy Exchange Program. Designed to provide required fluency in advanced conversation and reading/translation (with special emphasis on scientific texts). Final exam. Prereq: French 223 (255) or department permission. Sem hrs: 3 spring.

**For Lang 492.** 3(0)

*French 492* *French AFA Preparation II*

Continuation of French 491. Intensive program stressing everyday conversation and scientific vocabulary. Includes advanced composition, translations and development of note-taking skills in the language. Final exam. Prereq: French 491 or department permission and nomination by the Dean of the Faculty for participation in the French Air Force Academy Exchange Program. Sem hrs: 8 summer only.


**For Lang 495. Special Topics** 0-2(1)

Selected topics in foreign languages. Final exam or final report. Prereq: Department permission. Sem hrs and offering time determined by department.

**For Lang 499. Independent Study** 1(0)

Individual study or research conducted on a tutorial basis. Study may be in any of seven languages offered by the department. Topic or area of study/research must be approved by the department head. Final exam and/or paper. Sem hrs: 3 fall or spring.

### Supplementary Information

All cadets who have a background in one of the foreign languages offered at the Academy will be administered a placement examination in that language upon arrival at the Academy. Based on the results of that examination, a cadet may:

1. Receive validation credit for the core language requirement (4½ sem hrs) or:
2. Be placed into basic course sequences (For Lang 131, 141, or 141H) and required to take 4½ sem hrs For Lang study.

Cadets without prior language background will be placed into For Lang 131 (Elementary Basic Sequence) of the language they wish to study. Cadets with one or two years of previous study of the language will normally be placed into For Lang 141 (Accelerated Basic Sequence); those with two or more years will be placed into For Lang 141 honors course. For Lang 131-132 will meet every other day as follows:

| | *Fall* | *Spring* |
|---|---|---|
| Arabic | 2 hrs | 1 hr |
| Chinese | 2 hrs | 1 hr |
| French | 1 hr | 2 hrs |
| German | 1 hr | 2 hrs |
| Japanese | 2 hrs | 1 hr |
| Russian | 2 hrs | 1 hr |
| Spanish | 1 hr | 2 hrs |

For Lang 141-142 will meet every other day as follows:

| | *Fall* | *Spring* |
|---|---|---|
| French | 2 hrs | 1 hr |
| German | 2 hrs | 1 hr |
| Spanish | 2 hrs | 1 hr |

## Geography (Geog)

*Offered by the Department of Economics, Geography and Management*

**Geog 242. Analytical Techniques in Geography** 1(1)

Examines techniques in spatial and locational analysis to include quantitative and cartographic methods in geography. Specific problems representative of various subfields of geography are analyzed through application of these techniques. Directs the cadet in the preparation of a research proposal using the "scientific method." Final exam. Prereq: Geography major or department permission. Sem hrs: 3 spring.

**Geog 320. Principles of Geography** 1(1)

Geographic analysis of major world regions applying principles of physical and cultural geography to spatial patterns observed in the physical and cultural landscape. Comparison of regional association evolving from the synthesis of man's natural and cultural environment. Final exam. Sem hrs: 3 fall or spring. First offering: Spring 1978.

**Geog 340. Cartography** 1(2)

An introduction to concepts and methods of cartography. Includes history, earth geometry, reference systems, map projections and grids, map compilation, computer and statistical maps, map reproduction, and a limited exposure to applicants of aerial photo interpretation. Lab required. Final exam or final project. Sem hrs; 3 fall.

**Geog 350. Cultural Geography** 1(1)

A geographic analysis of cultural factors affecting the nature and distributions of population, settlements, and economic patterns. The processes of cultural change are considered in the development of primitive cultures to industrialized societies. Final exam. Sem hrs: 3 spring.

**Geog 352. Climatology** 1(1)

An analysis of the parameters governing the distribution of and the dynamic processes that control the earth's regional climates. Focuses on regional climatic types, anomalies and meteorological controls. Final exam. Sem hrs: 3 fall.

**Geog 353. Physical Geography** 1(2)

An analysis of the dynamic processes, distribution and structure of the earth's physical features. Focuses on fundamental concepts of physical geology, geomorphology, climate, soils and vegetation. Includes laboratory and local field trips within the Rocky Mountain region. Final exam. Sem hrs: 3 spring.

**Geog 370. Political Geography** 1(1)

Analysis of the spatial structure and processes of political systems at the level of the community, within national systems, and among nations. Examines geographic problems and processes of politically organized space including such topics as nationalism, development, and acquisition of natural resources. Final exam. Sem hrs: 3 spring.

**Geog 372. Economic Geography** 1(1)

Examines the physical, political, and demographic environments as they relate to the location of economic activity. Introduction to the institutional and theoretical approaches to the study of economic geographic phenomena. Special attention to contemporary industrial and commercial development. Final exam. Sem hrs; 3 fall.

**Geog 382. Geographic Application of Imagery Analysis** 1(2)

Principles and employment of remote sensing systems which obtain imagery in the visible and non-visible portions of the electromagnetic spectrum; rectification of imagery for detailed landform analysis; application of imagery to cultural and physical geographic analysis and cartography. Case studies and class projects focus on direct application of empirical data. Lab required. Final exam or project. Sem hrs: 3 spring.

**Geog 471. Western Europe and the Mediterranean** 1(1)

Geographical analysis of the physical and cultural aspects of Western Europe and the Mediterranean. Emphasis on the urban character of Europe and the region's inter-relationships with the rest of the world. Discussion of European countries' various political, economic, and cultural ties are linked to problems and accomplishments of the peoples of Europe. Final exam. Sem hrs: 3 fall.

**Geog 472. USSR and Eastern Europe** 1(1)
Geographic analysis of the physical, cultural, and economic base of the Soviet and East European socialist states. Topical analyses include assessment of the environmental base, nature, and extent of resource utilization, and spatial interaction. Concepts of classification and regionalization are applied throughout the course. Final exam. Sem hrs: 3 spring.

**Geog 475. Geography of the Developing World/East Asia and Latin America** 1(1)
Geographic analysis of the physical and cultural landscapes of selected regions of the developing world. Investigates the regional distribution of resources, economic structure, industrial strength, and settlement patterns. Focuses on developmental problems with respect to population growth, cultural divergence, social and political instabilities. Department will select a specific region for areal focus; emphasis on Latin America in odd-numbered years and on Far East in even-numbered years. Final exam. Sem hrs: 3 fall.

**Geog 491. Seminar on Basis of Geographic Thought and Research** 1(1)
Examines the development of geographic thought. Investigates changes in research tools and techniques over time. Includes an extensive exposure to the "scientific method." Directs the student in completing a substantive, empirical research report. Field research or its equivalent required. Final exam. Prereq: Department permission. Sem hrs: 3 fall.

**Geog 495. Special Topics** 1(1)
Selected topics in geography. Field trips dependent upon topics. Final exam or final report. Semester hours and offering time determined by department (not more than 3 sem hrs).

**Geog 499. Independent Study** 1(0)
Independent research and study in specific area of geography conducted on a tutorial basis. Term paper or final project. Prereq: 1/C standing and department permission. Sem hrs: 3 fall or spring.

## History (History)

*Offered by the Department of History*

**History 101. Europe and the World Since 1500** 1(1)
Main trends in world history from 1500 to the present. Emphasizes the emergence of Western Europe to world dominance by the late nineteenth century and its subsequent decline. Introduction to predominant characteristics of Latin American, Russian, Middle Eastern, African, and Far Eastern civilizations. Final exam. Sem hrs: 3 fall or spring.

**History 202. Modern Warfare and Society** 1(1)
Survey of the complex relationship between warfare and society from the American and French revolutions through the Vietnam war. The role of the military leader, the impact of technology, the evolution of military doctrine, and the development of air warfare are related to the changing character of warfare. Final exam. Prereq: History 101. Sem hrs: 3 fall or spring.

**History 303. The United States in a Changing World: Critical Issues** ½(1)
Examines the historical development of selected critical issues confronting contemporary American society. Issues considered include the role of minorities in American life, the impact of industrialization, the expansion of the role of the federal government, and America's response to crucial world problems. Final exam. Prereq: History 101. Sem hrs: 1½ fall or spring.

**History 330. Historical Methods** 1(1)
Methods of historical research, analysis, evaluation, and writing. Term paper. Prereq: History major or department permission. Sem hrs: 3 fall or spring.

**History 332. United States Diplomatic History** 1(1)
Emphasizes emergence of the United States as a world power and the associated problems. Examines diplomatic policies and their objectives and the factors which have influenced the conduct of diplomacy. Final exam. Prereq: History 101. Sem hrs: 3 fall.

**History 335. Regional History of the United States** 1(1)
Traces America's transition from a rural to an urban society and focuses on unique regional contributions to the development of the nation. Each year the History Department will select a specific region as a focus for the course. Final exam. Prereq: History 101. Sem hrs: 3 fall.

**History 341. History of Latin America** 1(1)
The discovery, conquest, and growth of Spanish and Portuguese America. Emphasizes political, social, economic, and cultural institutions since the wars of independence with particular stress on twentieth century problems. Final exam. Prereq: History 101. Sem hrs: 3 spring.

**History 343. History of the Far East** 1(1)
Modern history of East Asia with emphasis on China and Japan. The fundamental cultural developments; implications of contemporary tensions; the political, social, and economic results of nineteenth and twentieth century relationships with Western powers. Final exam. Prereq: History 101. Sem hrs: 3 spring.

**History 344. Origins of Modern Europe** 1(1)
The political, social, economic, and military history of Europe from the early Middle Ages to the French Revolution. Primary emphasis is on the development of institutions and ideas that determined the course of European history and shaped our own era. Final exam. Prereq: History 101. Sem hrs: 3 fall.

**History 345. Modern European History** 1(1)
The political, social, economic, and military history of Europe from the French Revolution to the present. Emphasis is on the following: crucial forces, such as nationalism, socialism, and the industrial revolution; the origins and results of the two world wars; key personalities of the era; the development of contemporary Europe. Final exam. Prereq: History 101. Sem hrs: 3 spring.

**History 346. History of Russia** 1(1)
Survey of Russian domestic and foreign affairs from the ninth century to the present Soviet regime. Emphasis on political, social, economic, and cultural developments since 1801. Final exam. Prereq: History 101. Sem hrs: 3 fall.

**History 363. Unconventional Warfare** 1(1)
Evolution, theory, and practice of insurgent and revolutionary warfare throughout the world with special attention given to Southeast Asia. Unconventional warfare studied in terms of historical perspective, major philosophies involved, and actual insurgencies. Examination of counterinsurgency operations in various areas and circumstances. Final exam. Prereq: History 202. Sem hrs: 3 spring.

**History 371. Air Power and Modern Warfare** 1(1)
History of the air weapon with primary emphasis on leadership and tactics as they evolved during the twentieth century. Covers both the United States and Europe stressing the constant interplay between personalities, institutions, theories, technology, combat experience, and evolving doctrine. Final exam. Prereq: History 202. Sem hrs: 3 fall.

**History 372. History of the Middle East and Africa** 1(1)
Survey of the history of the Middle East and Africa with emphasis on ethnic, cultural, and religious development and growth of major problems in the modern period. Topics include early empires, impact of Islam, European imperialism, and ethnic nationalism. Final exam. Prereq: History 101. Sem hrs: 3 spring.

**History 382. Science, Technology, and Warfare** 1(1)
Investigates the historical roots of modern science and technology. Focuses on the interaction between science and technology and their impact on warfare. Final exam. Prereq: History 101. Sem hrs: 3 fall.

**History 457. History of Military Thought** 1(1)
Historical investigation of the ideas of selected major military thinkers from the time of Machiavelli to the present. Emphasis is on those writers whose impact on evolving strategy and doctrine, whether on land, sea, or in the air, has been most far-reaching. Final exam. Prereq: History 202. Sem hrs: 3 fall.

**History 480. History of the American Way of Life** 1(1)
Examines the social and cultural evolution of the American way of life. Stresses the impact of the industrial revolution in the nineteenth century and America's rise to world power in the twentieth century. Special consideration is given to the unique experiences of racial, religious, and ethnic minorities. Final exam. Prereq: History 303. Sem hrs: 3 spring.

**History 494. The American Way of War** 1(1)
Course treats America's wars and warriors from Bunker Hill to Linebacker II. Primary attention is on how Americans have fought their wars. Also considered are why America went to war, the raising of armed forces, and the reactions to the effects of war. Particular emphasis is given to the role of leadership, both civil and military. Final exam. Prereq: History 202. 1/C standing or department permission. Sem hrs: 3 spring.

**History 495. Special Topics** 1(1)
Selected topics in history. Final exam/final report. Prereq: History 101. Sem hrs: 3 fall or spring.

**History 499. Independent Study** 1(0)
Reading and research in any recognized area of historical study. Areas selected by instructor depend on student interest. Term paper. Prereq: Department permission. Sem Hrs: 3 fall or spring.

## Humanities (Hum)

*Offered by the Departments of English and Foreign Languages*

**Area Stu 351. The American Identity** 1(1)
Interdisciplinary course. Considers the origins, development, and nature of the American experience. Unifying topics may include the American Dream or American Regionalism. Readings, reports, and projects incorporate the views and methodology of literature, law, philosophy, history, folklore, music, art, geography, political science, ecnomics, and social science. Seminar approach. Final exam. Prereq: English 111. Sem hrs: 3 fall.

**Hum 461. Russian Literature** 1(1)
A study of representative Russian authors (such as Pushkin, Chekhov, Dostoevsky, Tolstoy, Sholokhov, Pasternak, and Solzhenytsyn) in their historical and cultural setting and their impact on the shaping of the national character of the Russian people. Final exam. Sem hrs: 3 spring.

**Hum 463. Far Eastern Literature** 1(1)
An historical survey and analysis of major literary works of the Far East with emphasis on China and Japan. Final exam. Sem hrs: 3 fall.

## Instructional Technology (Inst Tch)

*Offered by the Directorate of Audiovisual Services*

**Inst Tch 101. Reading Improvement** 0(1)
Improvement of reading skills to include general rate increases while maintaining and improving comprehension levels, as well as proper reading approaches in the content areas. Final exam. Sem hrs: ½ fall.

**Inst Tch 102. Basic Typing** 0(1)
Basic typing limited to skills needed for theme, report, and military/personal correspondence typing. Final exam. Pass/Fail. Sem hrs: ½ fall.

## Law (Law)

*Offered by the Department of Law*

**Law 300. An Introduction to Law** 1(1)
An introduction to the substance and administration of law, including the judicial process and legal reasoning. Examines the relationship between law and social order, how disputes are resolved and freedom protected. Fosters a sense of fairness by studying the nature, history, and functions of law and its application in contracts, property, torts, and constitutional rights. Final exam. Prereq: at least 3/C standing and Pol Sci 201. Must be completed prior to a cadet's seventh semester. Sem hrs: 3 fall or spring.

**Law 400. Law for Commanders** 1(1)
A survey of the principles of public and private law which officers encounter in their official and personal capacities, including crimes, evidence, military justice, administrative law, standards of conduct, legal problems of command, laws of war, laws relating to prisoners of war, legality of orders, and personal estate planning. Final exam. Prereq: Law 300 (210) and 1/C standing. Sem hrs: 3 fall or spring.

**Law 451. American Constitutional Law** 1(1)
An inquiry into legal problems which arise when constitutionally divided power is allocated to separate elements of government. Special attention is given to the judicial branch as arbiter in determining the limits on national and state power, in protecting the individual against government activity which offends the Bill of Rights and other constitutional guarantees, and in securing civil rights. Final exam. Prereq: Pol Sci 201 and 1/C or 2/C standing. Sem hrs: 3 fall.

**Law 461. International Law** 1(1)
The role of public international law in the decision-making processes of sovereign nations. Topics include limitations on national power over the oceans and seabed, the law of airspace, space, and celestial bodies, sovereign immunity, the legal status of members of the armed forces stationed abroad, international protection of human rights, restrictions on methods and means of combat, the use of force by nations, and the role of the United Nations, and other international organizations. Final exam. Prereq: 1/C or 2/C standing. Sem hrs; 3 fall.

**Law 462. Government Contract Law** 1(1)
Comprehensive study of government contract law with emphasis given to basic legal principles, procurement policy, methods of procurement, types of contracts, contract clauses, taxation, regulation, social and economic provisions, disputes procedures, default remedies, and terminations. Final exam. Prereq: Law 300; 1/C or 2/C standing. Sem hrs: 3 spring.

**Law 495. Special Topics** 1(1)
Selected topics in law. A seminar in the legal implications of contemporary social, economic, and political problems. Examines the ability of the American legal system to solve problem areas such as organized and white collar crime, prison reform, environmental and population control, welfare reform, abortion, rights to privacy, war and morals, and others. Final report. Prereq: 1/C or 2/C standing and department permission. Limited enrollment. Sem hrs: 3 fall or spring.

## Management (Mgt)

*Offered by the Department of Economics, Geography and Management*

**Mgt 203. Introduction to Management** ½(1X)
Introduction to the principles and techniques of management, with major emphasis upon planning, organizing, and controlling. Theoretical concepts are introduced with applications to the needs of both cadet managers and future Air Force officers. Case studies and experiential problems. Final exam. Prereq: Econ 201 and concurrent enrollment in Econ 202 (for scheduling). Sem hrs: 1½ fall or spring.

**Mgt 331. Statistical Decisions in the Management Environment** 1(1)
Emphasizes analytical input to the decision-making process. The use of probabilities to aid in making decisions in the face of uncertainty is stressed. Major topic areas include the practical application of basic probability concepts and statistical techniques, interval estimation, hypothesis testing, nonparametric methods, and regression analysis. Final exam. Prereq: Math 220. Sem hrs: 3 fall or spring.

**Mgt 341. Introduction to Accounting** 1(1)
Introduction to processes that influence financial and managerial decisions. Fundamental accounting concepts and techniques necessary for effective administration of an organization are studied. These concepts and techniques include such topics as the analysis of transactions, classification and recording of data, and the amortization of assets. Final exam. Sem hrs: 3 fall or spring.

**Mgt 346. Organizational Theory** 1(2)
The internal dynamics of complex organizations and their environmental relationships are treated in this seminar. Organization theories and research conclusions are considered, and learning is confirmed by encountering a diversity of organizational simulations and experiences, with emphasis on organizational diagnosis and design. Term project of final exam. Prereq: Mgt 203. Sem hrs: 3 fall or spring.

**Mgt 360. Survey of Management Science** 1(1)

Introduces the basic management science and decision analysis techniques. Topics included are decision analysis, linear programming, inventory theory, and queueing theory. Emphasis is on application of these tools to solve Air Force management problems. Final exam. Prereq: Math 220. Sem hrs: 3 spring or fall.

**Mgt 361. Personnel Management and Industrial Relations** 1(1)

Surveys the field of personnel management to include personnel selection, training, performance appraisal, and compensation with a special emphasis on the Government impact on each of these activities. Includes an introduction to labor relations in the United States with an emphasis on the collective bargaining process. Examines the Federal Civil Service and Military Personnel Systems. Contemporary issues, films, guest speakers, and case studies are used to highlight major topic areas. Final exam or research project. Field trip. Prereq: Mgt 203 or concurrent enrollment in Mgt 203. Sem hrs: 3 fall or spring.

**Mgt 382. Introduction to Finance** 1(1)

An introduction to the basics of financial markets, specific investment vehicles (corporate stocks and bonds, mutual funds, government and municipal bonds, real estate and commodities), investment analysis and how financial decisions should be made. Topics include capital markets and institutions, risk and portfolio analysis and financial analysis. A term project is used to provide experience in developing an investment portfolio and in investment decision making. Final exam. Prereq: Econ 222 (202, 212). Mgt 341 is desirable. Sem hrs: 3 fall or spring.

**Mgt 432. Managerial Accounting** 1(1)

Provides basic insights into the managerial implications and applications of accounting data. Topics covered include accounting controls and reports, control of decentralized operations, basic cost accounting, flow of funds analysis, budgeting, and use of quantitative techniques to aid decision making. Final exam. Prereq: Mgt 341. Sem hrs: 3 spring.

**Mgt 437. Managerial Finance** 1(1)

Financial analysis, policy and decision making are examined from the internal viewpoint of a financial manager. Basic concepts and tools of financial analysis, asset management, capital budgeting, financing, and valuation are stressed. Included in the course are case studies and problems designed to expose the student to actual financial problems and their solutions. Final exam. Prereq: Mgt 341, Mgt 382 (may be taken concurrently). Sem hrs: 3 fall.

**Mgt 460. Management Science I** 1(1)

Emphasizes the management science methods necessary to analyze most basic organizational questions. Major topic areas include model building, advanced linear programming, sensitivity analysis, the dual problem, inventory systems, transportation theory, and queueing theory. Final exam or term project. Prereq: Mgt 360. Sem hrs: 3 fall.

**Mgt 462. Management Science II** 1(1)

Study of advanced management science techniques including transportation problems, networks, dynamic programming, integer programming and nonlinear programming. Emphasis on model formulation and Air Force applications. Term project. Prereq: Mgt 460 or department permission. Sem hrs: 3 spring.

**Mgt 472. Administrative Policy and Strategy** 1(2)

Stresses problem identification, strategic planning, decision theory, policy formulation, and general management issues through the use of cases and critical incidents. Current developments in management are reviewed and applied to a variety of management problems. Actual involvement in management situations is emphasized, including at least one field. Final exam. Prereq: 1/C standing. Sem hrs: 3 spring.

**Mgt 475. Principles of Marketing** 1(1)

A study of the concepts, tools and techniques of marketing management. Markets, life-cycle, product development, procurement, total cost concepts, product and service promotion, and distribution planning are topics discussed. Films, case studies, guest speakers are used to elaborate concepts. A term project focuses on the applications of marketing management to Air Force and business organizations. Term project. Prereq: Mgt 203. Sem hrs: 3 fall.

**Mgt 485. Systems Acquisition and Management** 1(1)

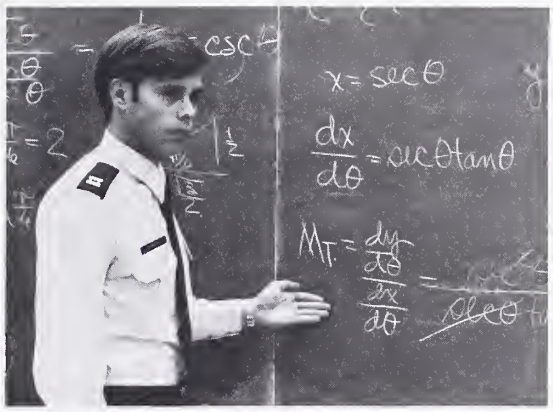
Discussion of management problems inherent in development and acquisition of large, complex systems and the buyer-seller relationships of government agencies and their industrial contractors. Major areas of study include: the acquisition environment, policy formulation, management of acquisition activities, modeling and planning, acquisition and negotiation strategy. Case studies of recent weapon systems programs and a program management simulation of a new weapon system are used to provide the setting for class discussions. Final exam. Sem hrs: 3 spring.

**Mgt 495. Special Topics** 1(1)

Selected topics in management. Final exam or final report. Prereq: Department permission. Sem hrs and offering time determined by department (not more than 3 sem hrs).

**Mgt 499. Independent Study** 1(0)

Tutorial investigation of a specific area of management. No final. Sem hrs: 3 fall or spring.




## Mathematics (Math)

*Offered by the Department of Mathematical Sciences*

**Math 130. Pre-Calculus Mathematics** 1(1)
College algebra and trigonometry. Final exam. Prereq: Department recommendation. Sem hrs: 3 fall.

**Math 131. Calculus I** 1(1)
Functions; plane analytic geometry; limits, including limits at infinity and infinite limits; theorems on differentiation; differentiation of algebraic functions; differential calculus. Final exam. Sem hrs: 3 fall or spring.

**Math 132. Calculus II** 1(1)
Derivatives and antiderivatives, to include $e^x$, $\ln x$, trig and inverse trig functions, and logarithmic differentiation; definite integrals; calculus applications to include min/max, area between curves, fluid pressure, center of mass, and moments of inertia. Final exam. Prereq: Math 131. Sem hrs: 3 fall or spring.

**Math 133. Calculus III** 1(1)
Integration techniques to include substitution methods, integral tables, integration by parts, and improper integrals. Multiple variable calculus, including vectors, multiple integrals, and partial differentiation; solid analytic geometry to include lines, planes, and surfaces in 3-space. Final exam. Prereq: Math 132. Sem hrs: 3 fall or spring.

**Math 210. Differential Equations and Matrices** 1(1)
Differential equations, Taylor polynomials, infinite series; matrices and linear algebraic equations; and numerical methods. Final exam. Prereq: Math 133. Sem hrs: 3 fall or spring.

**Math 220. Probability and Statistics** 1(1)
Introduction to descriptive and inferential statistics, including frequency distribution, sampling techniques, discrete and continuous random variables, expected values, statistical estimation, hypothesis testing, regression and correlation analysis using hand calculators in engineering, physical and social science applications. Final exam. Prereq: Math 133. Sem hrs: 3 fall or spring.

**Math 320. Foundations of Mathematics** 1(1)
Spans a gap which exists between an introductory calculus sequence and more theoretically oriented courses in mathematics and the basic sciences which typically follow such a sequence. Fundamental concepts governing the use and development of mathematics are presented in a unified fashion. Designed to acquaint the cadet with the axiomatic structure of mathematics, a knowledge of basic logic, the meaning and basic methods of proof in mathematics, and an awareness of what modern mathematics is like. Basic concepts of set theory, relations, functions, the real and natural number systems, and algebra analysis is covered. Final exam. Prereq: Math 210. Sem hrs: 3 fall or spring.

**Math 330. Fourier Analysis, Laplace Transform, And Applied Vector Analysis** 1(1)
Fourier series, Fourier integral (transform); introduction to Discrete Fourier Transform (DFT); Laplace transform; vector calculus, gradient divergence, curl; Divergence theorem, Stokes' theorem, Green's Lemma; complex variables, analytic functions, conformal mapping. Final exam. Prereq: Math 133. Sem hrs: 3 fall or spring.

**Math 341. Introductory Numerical Analysis** 1(1)
Numerical solutions of non-linear equations; numerical methods in linear algebra; theory of polynomial approximations; interpolation theory; error analysis; numerical integration and numerical solution of differential equations; computer programming laboratory exercises. Final exam. Prereq: Math 210 (134); Comp Sci 100 (200). Sem hrs: 3 fall or spring.

**Math 351. Applied Differential Equations** 1(1)
Second order linear differential equations; numerical techniques; power series solutions; systems of first order linear differential equations, and partial differential equations. Final exam. Prereq: Math 210 (134). Sem hrs: 3 fall or spring.

**Math 357. Probability with Statistics** 1(1)
Essentials of modern probability and random variables; discrete and continuous random variables and their distributions; characterizations of random variables; derived distributions; sampling distributions; and statistical hypothesis testing. Successful completion fulfills requirement for Math 220. Final exam. Prereq: core math sequence or department permission. Sem hrs: 3 fall or spring.

**Math 358. Statistics** 1(1)
Common techniques of statistical inference; probability distributions used in statistics; hypothesis testing, experimental design considerations; analysis of variance, point and confidence interval estimation; regression analysis, nonparametric analysis, and introduction to reliability. Final exam. Prereq: Math 357, Sem hrs: 3 fall or spring.

**Math 360. Linear Algebra** 1(1)
Matrix algebra and systems of linear equations; determinants; vector spaces including function spaces and inner product spaces; linear transformation including rotations, matrix of a linear transformation, change of basis and transition matrices; eigenvalues,

eigenvectors, and quadratic forms; computation with and properties of special matrices. Final exam. Prereq: Math 210 (134). Sem hrs: 3 fall or spring.

**Math 365. Modern Algebra** 1(1)

Study of algebraic structures and functions between these structures. Topics include cyclic groups; permutation groups, nomial subgroups and quotient groups; quotient rings and ideals; polynomial rings; finite field extensions. Applications to number theory, geometry, and coding theory. Final exam. Prereq: Math 210 (134). Sem hrs: 3 spring.

**Math 366. Advanced Calculus I** 1(1)

Theoretical study of concepts of calculus for functions of one variable. Final exam. Prereq: Math 320; completed or enrolled in Math 360. Sem hrs: 3 fall or spring.

**Math 367. Advanced Calculus II** 1(1)

Theoretical study of concepts in multivariable calculus. Final exam. Prereq: Math 366. Sem hrs: 3 fall.

**Math 368. Intermediate Differential Equations** 1(1)

A study of linear and non-linear differential equations from both computational and theoretical point of view. Topics include nth order linear equations, systems of differential equations, series solution techniques, stability theory, and Lyapunov functions. Final exam. Prereq: Math 360; completed or enrolled in Math 366. Sem hrs: 3 fall.

**Math 371. Operations Research I** 1(1)

An introductory course in the mathematical techniques of operations research emphasizing applications. Topics include linear and nonlinear programming, network scheduling and dynamic programming. Final exam. Prereq: Math 220 or Math 357. Sem hrs: 3 fall.

**Math 441. Linear Programming** 1(1)

Review of matrix algebra, convex sets and linear inequalities. Theory and computer implementation of the simplex and transportation algorithms. Duality theory and sensitivity/postoptimality analysis. Mathematical modeling and Air Force applications. Introduction to integer and non-linear programming, models and algorithms. Final exam. Prereq: Math 360. Sem hrs: 3 fall.

**Math 442. Operations Research II** 1(1)

A second introductory course in the mathematical techniques of operations research. Topics include decision anaylsis and game theory, queueing models and inventory analysis. Final exam. Prereq: Math 371. Sem hrs: 3 spring.

**Math 451. Complex Variables** 1(1)

Analytic functions; mapping, integrals; power series; residues and poles; applications. Final exam. Prereq: Math 210 (134). Sem hrs: 3 spring.

**Math 455. Advanced Engineering Mathematics** 1(1)

Applied partial differential equations; solutions of boundary value problems. Methods of solution include eigenfunction expansion, Green's formulas, and variation of parameters. Introduction to numerical solution methods. Final exam. Prereq: Math 351 or Math 368. Sem hrs: 3 fall or spring.

**Math 457. Probabilistic Models in Operations Research** 1(1)

A second course in probability stressing the creation, analysis, and interpretation of mathematical models of probabilistic processes. Introduces the concept of sequences of random variables, Markov Chains, branching processes and birth-death processes with emphasis on military applications. Final exam or final report. Prereq: 1/C standing, Math 357. Sem hrs: 3 spring.

**Math 495. Special Topics** 1(1)

Selected advanced topics in mathematics. Final exam. Prereq: Department permission. Sem hrs: 3 fall or spring.

**Math 499. Independent Study and Research** 1(0)

Individual study and/or research under the direction of a faculty member. Oral midterm and final; term paper. Prereq: Department permission. Sem hrs: 3 fall or spring.

## Mechanics (Mech)

*Offered by the Department of Engineering Mechanics*

**Mech 210. Engineering Materials** 1(2)

Engineering materials and their application in the design of practical systems. Emphasis on materials properties, mechanical behavior and failure mechanisms, including corrosion, fatigue, and fracture effects. Influence of composition and processing on material properties. Final exam. Prereq: Mech 110, Engr 110. Sem hrs: 3 fall or spring.

**Mech 320. Dynamics** 1(1)

Equilibrium in three dimensions. Kinematics including absolute and relative motion. Kinetics including force-mass-acceleration, work-energy, and impulse-momentum. Free and forced linear vibrations of a single degree of freedom system. Vector methods of solution are emphasized where applicable. Final exam. Prereq: Mech 110; Engr 110; Math 210. Sem hrs: 3 fall or spring.

**Mech 331. Aircraft Structures** 1(1)

A study of techniques commonly used to determine loads and their effect on aircraft structural components. Includes effect of bending, torsion, and shear on typical aircraft structural components using both classical and energy methods. Structural stability concepts are introduced through the elastic buckling of columns. Final exam. Prereq: Mech 210. Sem hrs: 3 fall.

**Mech 332. Aircraft Structural Design** 1(2)

Concepts and techniques of Mech 331 are applied in the design of typical aircraft structural components. Additional topics included are connection design, inelastic design, semi-tension field beam design, and panel design. Special topics such as damage tolerant design, aircraft structural repair, and cost effective design are introduced. Lab. Final report. Prereq: Mech 331 and Aero 311. Sem hrs: 3 spring.

**Mech 342. Introductory Metallurgy** 1(1)
Introduces the basic concept of metallurgical thermodynamics and kinetics and applies these concepts to phase diagrams of alloy systems, corrosion of metals, and materials processing. Final exam. Prereq: Mech 210, Math 210. Sem hrs: 3 spring.

**Mech 352. Mechanical Properties of Materials** 1(1)
Behavior of materials under simple and combined stress systems. Elementary crystal structure and dislocation theory, strengthening mechanisms. Principles of plastic deformation; brittle fracture; fatigue; failure theories. Fundamentals of fracture mechanics and behavior of composite materials; analysis of materials and design influences. Final exam. Prereq: Mech 210, Math 210. Sem hrs: 3 fall or spring.

**Mech 395. Automotive Systems Analysis** 1(2)
An analysis of system engineering with special emphasis on the application of engineering principles to automotive components and their integration into a complete system. Provides a better appreciation of the application of theoretical analysis in the creation, design, maintenance, trouble-shooting and repair of complicated engineering systems. Includes vehicle dynamics, suspension system, power plant, drive train, electrical-mechanical system, steering and braking systems, types of tires, design, selection of materials, safety devices, and the integration of these into a workable unit. Final report. Prereq: 1/C or 2/C standing; Mech 320. (Course enrollment will be limited; cadets desiring to take this course must contact the department for approval prior to registration.) Sem hrs: 3 fall or spring.

**Mech 420. Vibrations** 1(1)
Free and forced vibrations of single and multidegree of freedom systems. Includes linear and non-linear systems, treats multidegree system by matrix methods and introduces vibrations of continuous media. Final exam. Prereq: Math 351 and Mech 320. Sem hrs: 3 fall or spring.

**Mech 432. Advanced Structural Mechanics** 1(1)
Energy methods of structural analysis including the principles of virtual work and minimum potential energy as applied to the analysis of trusses and frames. The finite element approach is introduced. Stiffness matrices for elements are obtained using both equilibrium and energy approaches. Problem solving procedures are illustrated using the computer and FORTRAN language. Final exam. Prereq: Mech 332. Sem hrs: 3 fall or spring.

**Mech 451. Physical Metallurgy** 1(2)
A study of physical metallurgy and properties of materials. Basic principles covered include materials structure and imperfections, diffusion, thermodynamics, phases and phase transformations, the iron-carbon system, steels and alloys, and thermomechanical processing. Lab. Final exam. Prereq: Class of '81—Mech 352, Class of '82 and subsequent—Mech 342. Sem hrs: 3 fall.

**Mech 454. Intermediate Dynamics** 1(1)
Study of three-dimensional kinematics, dynamics of particles and systems of particles. Lagrangian dynamics and dynamics of rigid bodies. Final exam. Prereq: Mech 320; Math 351. Sem hrs: 3 fall.

**Mech 459. Advanced Aerospace Materials** 1(1)
Advanced and theoretical topics in the development of high temperature materials for aerospace systems. An examination of the fundamental principles of metallurgical thermodynamics. Analysis of ideal and non-ideal liquid and solid alloys, heterogeneous equilibria, phase diagrams, gas-metal reactions and corrosion principles; oxidation-resistant and high-temperature materials. Problems in materials application at high temperature. Field trip. Final exam. Prereq: Class of '81—Mech 352, Class of '82 and subsequent—Aero 363 and Mech 342. Sem hrs: 3 spring.

**Mech 461. Experimental Mechanics** 1(2)
Introduction to experimental techniques. Includes the theory and application of dynamic instrumentation, photography, strain gauges, photo-elasticity, holography, and non-destructive inspection. Approximately one-half of the class periods are spent in the lab gaining experience in the use of the latest equipment. Included is a special project for which each cadet, or group of cadets, designs, builds, calibrates, and tests a transducer. Final exam. Lab. Prereq: Mech 320 (361); Completed or enrolled in Mech 331. Sem hrs: 3 fall.

**Mech 462. Engineering Design** 1(2)
Application of engineering principles to the creative design process. Special emphasis is placed on the analysis, design, and construction of prototype models. Topics include the creative design process, basic manufacturing techniques, technical communications, measurement systems, and project management methods. Major design project and a final report. Lab. Prereq: Mech 320, Mech 451, or Mech 461. Sem hrs: 3 spring.

**Mech 482. Advanced Aerospace Structures** 1(1)

A continuation of Aerospace Structures with emphasis on the finite element method. Includes derivation of element stiffness for beam, two-dimensional plane and plate bending elements using assumed displacement functions. Computer solution to continuous beam, large scale plane and plate bending problems. Final exam. Prereq: Mech 432. Sem hrs: 3 spring.

**Mech 495. Special Topics** 1(1)

Selected topics in mechanics. Final exam or final report. Prereq: Department permission. Sem hrs: and offering time determined by department (not more than 3 sem hrs).

**Mech 499. Independent Study** 1(0)

Individual study, research, or design on a topic established with the permission of the department head. Final report. Sem hrs: 3 fall or spring.

## Military Training (Mil Tng)

*Offered by the Deputy Commandant for Military Instruction (Exceptions are noted under course descriptions)*

**Mil Tng 100. Basic Cadet Training** 0(0)

Approximately six-week transition period from civilian to military life. Indoctrination in the overall Academy program, cadet regulations, the Honor Code, manual of arms, drill, customs and courtesies, and other general military subjects. Introduction to basic Air Force weapons, firing the M-16 rifle and .38 pistol. Pass/Fail. No final. Sem hrs: 5 summer.

**Mil Tng 200. Third Class Summer Training** 0(0)

Three weeks of training in any of the following courses: Mil Tng 201, Mil Tng 220, Armnshp 451/490. All options are pass/fail. No final.

**Mil Tng 201. Operation Noncom Program** 0(0)

Conducted at selected Air Force bases. The program provides an insight into and appreciation of the role of enlisted personnel in the accomplishment of the Air Force mission. Pass/Fail. No final. Sem hrs: 2 summer.

**Mil Tng 220. Survival, Evasion, Resistance, and Escape Training SERE** 0(0)

Three-week Basic Aircrew Survival Training program of approximately two weeks on-base training covering global aspects of survival and code of conduct, and approximately one week of field training. Completion satisfies USAF Survival Training requirements. Pass/Fail. No final. Sem hrs: 2 summer.

**Mil Tng 300. Second Class Summer Training** 0(0)

Six weeks of training in any two of the following three-week courses: Mil Tng 301, Mil Tng 302, Mil Tng 303, Mil Tng 304, Mil Tng 305, Mil Tng 306, Mil Tng 307, Mil Tng 309, Mil Tng 320, Mil Tng 452, Mil Tng 495, Armnshp 451/490, Armnshp 498C, Armnshp 498S, Av 493, and Av 498. All courses are Pass/Fail except Av 460, Av 493, and Av 498. No final except Av 493.

**Mil Tng 301. Operation Third Lieutenant Program** 0(0)

Conducted at selected Air Force bases. Provides exposure to an operational Air Force unit and functions of a junior officer. Pass/Fail. No final. Sem hrs: 2 summer.

**Mil Tng 302. BCT Leadership Duty** 0(0)

Leadership positions as instructors or noncommissioned officers (NCOs) in the cadet chain of command in the Basic Cadet Training program for the new Fourth Class. Pass/Fail. No final. Sem hrs: 2 summer.

**Mil Tng 303. RECONDO Training** 0(0)

Field tactical training conducted by the U.S. Army at Fort Carson and North Cheyenne Canyon. Pass/Fail. No final. Sem hrs: 2 summer.

**Mil Tng 304. Open Circuit Scuba Training** 0(0)

Diving training program conducted by the U.S. Navy at San Diego. Satisfactory completion results in being certified world-wide scuba qualified. Pass/Fail. No final. Sem hrs: 2 summer.

**Mil Tng 305. Boys State/Girls State** 0(0)

Positions as counselors for high school juniors at various American Legion Boys State encampments. Pass/Fail. No final. Sem hrs: 2 summer.

**Mil Tng 306. BSA Philmont** 0(0)

Positions at Philmont Scout Ranch in Cimarron, New Mexico, as rangers or instructors in the staff camp areas. Pass/Fail. No final. Sem hrs: 2 summer.

**Mil Tng 307. Composite Group Leadership Duty** 0(0)

Cadet NCO leadership positions maintaining command, control, and accountability and providing billeting for all cadets taking summer academic courses and transient cadets using cadet area facilities. Pass/Fail. No final. (Administered by the Deputy Commandant for the Cadet Wing.) Sem hrs: 2 summer.

**Mil Tng 309. Academy Awareness Program** 0(0)

Selected cadets serve as counselors and tutors for minority group students in the San Diego, Miami and Philadelphia school districts. (Administered by the

Minority Affairs Division under the office of Admissions and Registrar.) Sem hrs: 2 summer.

**Mil Tng 320. SERE Leadership Duty** 0(0)
Leadership positions as instructors and as NCOs in the cadet chain of command for the Third Class SERE Training Program. Pass/Fail. No final. Sem hrs: 2 summer.

**Mil Tng 330. Summer Leadership Preparation** 0(0)
Instruction and training for selected Third Class and Second Class cadets to prepare them for Second Class/First Class summer leadership or instructor positions. Pass/Fail. No final. Prereq: Pre-selection for key summer leadership or instructor position. (Administered by the Deputy Commandant for the Cadet Wing and the Deputy Commandant for Military Instruction.) Sem hrs: 1 spring.

**Mil Tng 400. First Class Summer Training** 0(0)
Six weeks of training in either one six-week course, two three-week courses, or special course from the following listings:

a. Three-week courses: Mil Tng 402, Mil Tng 403, Mil Tng 404, Mil Tng 405, Mil Tng 406, Mil Tng 407, Mil Tng 408, Mil Tng 409, Mil Tng 420, Mil Tng 452, Armnshp 441, Armnshp 490, Armnshp 498C, Armnshp 498S, Av 493, and Av 498. All three-week courses are Pass/Fail except Armnshp 441, Av 493, and Av 498. No final except Armnshp 441 and Av 493.

b. Six-week courses: Mil Tng 411, Science 499, Mil Tng 411 and Science 499 require final reports and are Pass/Fail. Sem hrs: 4 summer.

c. Special Programs: French 492, Mil Tng 495. French 492 is a graded course with separate registration and separate scheduling. Final exam. Summer. Mil Tng 495 sem hrs, leadership credit, and duration may vary depending on the nature of the program.

**Mil Tng 402. BCT Leadership Duty** 0(0)
Leadership positions as instructors or as officers in the cadet chain of command in the Basic Cadet Training program for the new Fourth Class. Pass/Fail. No final. (Administered by the Deputy Commandant for the Cadet Wing and the Deputy Commandant for Military Instruction.) Sem hrs: 2 summer.

**Mil Tng 403. RECONDO Training** 0(0)
Field tactical training by the U.S. Army at Fort Carson in North Cheyenne Canyon. Pass/Fail. No final. Sem hrs: 2 summer.

**Mil Tng 404. Open Circuit Scuba Training** 0(0)
Diving training program conducted by the U.S. Navy at San Diego. Satisfactory completion results in being certified world-wide scuba qualified. Pass/Fail. No final. Sem hrs: 2 summer.

**Mil Tng 405. Boys State/Girls State** 0(0)
Positions as counselors for high school juniors at various American Legion Boys State encampments. Pass/Fail. No final. Sem hrs: 2 summer.

**Mil Tng 406. BSA Philmont** 0(0)
Positions at Philmont Scout Ranch in Cimarron, New Mexico, as rangers or instructors in the staff camp areas. Pass/Fail. No final. Sem hrs: 2 summer.

**Mil Tng 407. Composite Group Leadership Duty** 0(0)
Cadet officer leadership positions maintaining command, control, and accountability and providing billeting for all cadets taking summer academic courses and transient cadets using cadet area facilities. Pass/Fail. No final. (Administered by the Deputy Commandant for the Cadet Wing.) Sem hrs: 2 summer.

**Mil Tng 408. Manpower Unlimited** 0(0)
Positions at the Academy as counselors for underprivileged children. Pass/Fail. No final. (Administered by the Director of Plans and Programs under the Deputy Chief of Staff Operations.) Sem hrs: 2 summer.

**Mil Tng 409. Academy Awareness Program** 0(0)
Selected cadets serve as counselors and tutors for minority group students in the San Diego, Miami and Philadelphia school districts. (Administered by the Minority Affairs Division under the Office of Admissions and Registrar.) Sem hrs: 2 summer.

**Mil Tng 411. Air Training Command Leadership Duty** 0(0)
Leadership positions with a Basic Military Training Squadron at Lackland AFB, Texas, as assistants to squadron commanders and as basic airmen training instructors and counselors. Pass/Fail. No final. Sem hrs: 4 summer.

**Mil Tng 420. SERE Leadership Duty** 0(0)
Leadership positions as instructors and as officers in the cadet chain of command for the Third Class SERE Training program. Pass/Fail. No final. Sem hrs: 2 summer.

**Mil Tng 452. Basic Airborne Training** 0(0)
Conducted at the U.S. Army Infantry School, Fort Benning, Georgia. Includes basic skills of static line parachute jumping. Pass/Fail. No final. Sem hrs: 2 summer.

**Mil Tng 491. Astronomy Operations.** 0(0)
One to three selected cadets will be accepted for leadership training at the Academy Planetarium and Observatory during each summer session. An interview with an Astronomy Branch instructor (CWINA) is required prior to acceptance. Completion of an Astronomy or Astronomy-related course at USAFA is recommended. (Administered by Aviation Science Division under the Deputy Commandant for Military Instruction.) Sem hrs: 2 summer.

**Mil Tng 495. Special Training Programs** 0(0)
Special training, participation, observing, leadership, and/or instructing programs conducted to fill a temporary or unforeseen need or to test a new program or concept prior to full implementation. Pass/Fail. No final. Sem hrs, leadership credit, and duration may vary depending on the nature of the program (not to exceed 7½ sem hrs).

## Navigation (Nav)

*Offered by the Deputy Commandant for Military Instruction.*

**Nav 471. Advanced Applied Navigation** 1(2)
Integrates additional navigation procedures, fuel planning and radar navigation with material from the basic aviation course. Flying, accomplished in the T-43, emphasizes the navigation proficiency required of a validation candidate entering Undergraduate Navigator Training (UNT). Cadets who satisfactorily complete this course may validate 20 training days of UNT and will better understand the environment in which crew members function. Prereq: Av 470 or AV 460; 1/C standing, Aviation Science Division approval. Sem hrs: 3 spring.

See Aviation listings for other Aviation Science courses.

## Philosophy (Philos)

*Offered by the Department of Philosophy and Fine Arts*

**Philos 300. Reasoning** 1(1)
An introduction to deductive and inductive logic. Analysis and evaluation of arguments and an examination of techniques of establishing validity and invalidity are emphasized. Final exam. Sem hrs: 3 fall. First offering: Fall 1981.

**Philos 310. Ethics** 1(1)
Critical study of major ethical themes such as responsibility, freedom, obligation, duty, and human rights. These themes are approached by reading major Western philosophers and are related to typical moral issues including those arising in the context of war. Also incorporates brief introduction to the study of philosophy. Final exam. Prereq: 1/C, 2/C, or 3/C standing or department permission. Sem hrs: 3 fall or spring.

**Philos 330. Introduction to the Philosophy of Science** 1(1)
Basic assumptions and principles of the sciences are analyzed. Emphasizes the nature of the scientific method, the status of scientific laws, concepts of theory construction and scientific explanation, the use of probability notions, problems involved in the social sciences, and the relation between the sciences and the humanities, especially in the formation of values. Final exam. Prereq: 1/C or 2/C standing or department permission. Sem hrs: 3 fall.

**Philos 350. Problems in Philosophy** 1(1)
An examination into some traditional problems of philosophy. Both classical and contemporary responses are considered. Emphasis is on the development of personal philosophic attitudes and skills as opposed to learning others' answers. Typical problems considered are: the nature of truth, skepticism and knowledge, the existence of God, the nature of reality, the relation of body to mind/soul, etc. Final exam. Prereq: 1/C, 2/C, or 3/C standing. Sem hrs: 3 fall. Last offering: Fall 1980.

**Philos 370. Introduction to Symbolic Logic** 1(1)
Propositional calculus, formal languages, truth tables, and proofs. Predicate calculus, models, Gentzen-type rules, axioms, quantifiers, and equality. Final exam. Prereq: Completed or enrolled in Comp Sci 100. Sem hrs: 3 fall or spring.

**Philos 382. American Philosophy** 1(1)
An examination of the philosophic background of Puritanism, the Revolutionary period, transcendentalism and pragmatism with special reference to the thought of major American philosophers such as Peirce, James, Royce, Santayana, Dewey. Final exam. Prereq: Completed or enrolled in Philos 310. Sem hrs: 3 spring.

**Philos 400. Great Religions of the World** 1(1)
A comparative and critical study of the world's great religions which emphasizes the relation of religion to morality; the nature of religious aspirations; the spiritual influence of religion upon culture and society; the sacred scriptures; the concepts of God, salvation, evil, and the afterlife. Includes a survey of religious thought and practice through a study of Christianity, Buddhism, Judaism, Hinduism, Confucianism, and Islam. Final exam. Prereq: 1/C, 2/C, or 3/C standing. Sem hrs: 3 fall or spring.

**Philos 495. Seminar in Philosophy** 1(1)
Selected topics in philosophy. Final exam or final report. Fall 1980 offering: The Military Mind. Spring 1981 offering: Managerial Ethics. Prereq: Department permission. Sem hrs: 3 fall or spring.

**Philos 499. Independent Study** 1(0)
Philosophical research guided by an instructor. Topics and meetings arranged with the instructor. No final. Prereq: Department permission. Sem hrs: 3 fall or spring.

## Physical Education (Phy Ed)

*Offered by the Department of Physical Education*

**Phy Ed 100. Basic Physical Training** 0(0)
Preparation for strenuous physical education and athletics by development of physical strength, endurance, agility, and coordination by means of conditioning exercises, obstacle course, and sports competition. Physical fitness and swimming tests. Special instruction in swimming and conditioning as needed. Pass/Fail. Sem hrs: 2 summer.

**Phy Ed 105. Competitive Athletics** 0(0)
Intramural and/or intercollegiate athletics. Pass/Fail. Sem hrs: 1 fall.

**Phy Ed 106. Competitive Athletics/ Physical Fitness Test** 0(0)
Intramural and/or intercollegiate athletics plus passing cadet minimums on Physical Fitness. Test. Pass/Fail. Sem hrs: 1 spring.

**Phy Ed 120. Gymnastics, Wrestling, Physical Development, Swimming, Boxing, and Fencing** 0(2)
Instruction in gymnastics, wrestling (men only), physical development (women only), swimming, boxing (men only) and fencing (women only). Remedial instruction in swimming for designated cadets. Sem hrs: 1 fall and spring.

**Phy Ed 205-206. Competitive Athletics/ Physical Fitness Test** 0(0)
Intramural and/or intercollegiate athletics plus passing cadet minimums on Physical Fitness Test. Pass/Fail. Sem hrs: Phy Ed 205—1 fall; Phy Ed 206—1 spring.

**Phy Ed 220. Racquetball, Squash, Tennis, and Physical Fitness Methods** 0(2)
Instruction in racquetball, squash, tennis and physical fitness methods. Remedial instruction in swimming for designated cadets. Sem hrs: 1 fall and spring.

**Phy Ed 305-306. Competitive Athletics/ Physical Fitness Test** 0(0)
Intramural and/or intercollegiate athletics plus passing cadet minimums on the Physical Fitness Test. Pass/Fail. Sem hrs: Phy Ed 305—1 fall; Phy Ed 306—1 spring.

**Phy Ed 320. Golf, Judo, Survival Swimming, and Volleyball** 0(2)
Instruction in golf, judo, survival swimming, and volleyball. Remedial instruction in swimming for designated cadets. Sem hrs: 1 fall and spring.

**Phy Ed 405-406. Competitive Athletics/ Aerobics Test** 0(0)
Intramural and/or intercollegiate athletics and must pass Aerobics Fitness Test. Pass/Fail. Sem hrs: Phy Ed 405—1 fall; Phy Ed 406—1 spring.

**Phy Ed 420. Lifesaving, Unarmed Combat, and Two Electives** 0(2)
Instruction in lifesaving, unarmed combat, and two electives (either instructor training, advanced tennis, ice skating, advanced golf, badminton, handball or strength training). Remedial instruction in swimming for designated cadets. Sem hrs: 1 fall and spring.

**Phy Ed 440. Physiology of Exercise** 1(1)
Selected classroom and laboratory studies of the human organism in motion. An examination of the physiological factors affecting human performance under various degrees of stress and environmental conditions. Emphasis is placed on control mechanisms, characteristics of muscular contraction, energy sources and other body adjustment mechanisms in response to physical exercise. No final. Prereq: Department permission. Sem hrs: 3 fall.

**Phy Ed 460. Scientific Principles and Methods of Coaching** 1(1)
The study of scientific principles of coaching from selected team and individual sports. The fundamental factors underlying athletic performance are analyzed in relation to the laws of physics. Emphasis is placed upon the basic coaching philosophy and methods of human motivation in athletics from various perspectives: biological, physiological, psychological, and sociological. No final. Prereq: Department permission. Sem hrs: 3 spring.

**Phy Ed 499. Independent Study** 1(0)
Individual research and study in the physical education field under the direction of a faculty member. Emphasizes the use of laboratory facilities. No final. Research report. Prereq: Phy Ed 440 and department permission. Sem hrs: 1-3 fall or spring.

## Physics (Physics)

*Offered by the Department of Physics*

**Physics 211. General Physics I** 1(1)
Review of mechanics emphasizing work and energy. Introduction to fluid mechanics and thermodynamics. Emphasis is placed on the conservation laws and the use of vectors and calculus. Applications selected from topics in atmospheric physics. Final exam. Prereq: Mech 110 (120). Completed or enrolled in Math 210. Sem hrs: 3 fall or spring.

**Physics 250. Introduction to Atmospheric Physics** 1(1)
Composition, structure, and behavior of the atmosphere. Emphasizes causes of observed phenomena in terms of fundamental physical concepts. Vertical structure, the nature of atmospheric variables and their interrelations, radiation processes, clouds, precipitation, wind, air masses and fronts, circulation patterns, vertical and horizontal analysis of a classical weather system. Final exam. Prereq: Physics 211. Sem hrs: 3 fall or spring.

**Physics 311. General Physics II** 1(1)
Fundamental principles of electricity and magnetism, wave motion, and optics. Emphasis is placed on the conservation laws and the use of vectors and calculus. Final exam. Prereq: Physics 211. Sem hrs: 3 fall or spring.

**Physics 352. Physical Processes of the Atmosphere** 1(1)
Cloud physics, water droplet and ice crystal growth, and precipitation processes. Atmospheric optics. Radar meteorology. The upper atmosphere. Radiation, with emphasis on target acquisition. Final exam. Prereq: Physics 250. Sem hrs: 3 spring.

**Physics 357. Classical Mechanics I** (1)
Particle kinematics and dynamics, conservation laws, gravitation, vibrations, rotating coordinate systems, central forces and an introduction to rigid body motion. Fundamental of mathematical physics including vector calculus. Final exam. Prereq: Physics 211; completed or enrolled in Math 351. Sem hrs: 3 fall.

**Physics 358. Classical Mechanics II** 1(1)
General rigid body motion, Lagrangian and Hamiltonian dynamics, vibrations, and an introduction to quantum mechanics. Fundamentals of mathematical physics including matrix algebra, integral transforms and partial differential equations. Final exam. Prereq: Physics 357. Sem hrs: 3 spring.

**Physics 363. Introduction to Modern Physics I** 1(1)
Introduction to special relativity. Consideration of the dual nature of light and of the wave nature of particles. Investigation of the Bohr model of the atom. Introduction to quantum mechanics and its application to solution of problems involving simple forms of potential energy. Application of the Schroedinger equation to the hydrogen atom. Final exam. Prereq: Completed or enrolled in Physics 311 (212); completed or enrolled in Math 351. Sem hrs: 3 fall.

**Physics 364. Introduction to Modern Physics II** 1(1)
Continuation of Physics 363. Quantum mechanical approach to angular momentum as applied to hydrogen atom. Atomic and molecular spectra. Investigation of various models of the nucleus. Nuclear reactions and decay schemes; fission and fusion. Particle detectors and accelerators. Brief introduction to solid state physics. Discussion of elementary particle theory. Final exam. Prereq: Physics 363 in preceding semester. Sem hrs: 3 spring.

**Physics 370. Introduction to Space Science** 1(1)
A conceptual survey of the space environment including such topics as planetary atmospheres, solar phenomena, trapped-radiation belts, radio astronomy, extraterrestrial life, and space exploration. Field trip. Final exam. Prereq: Completed or enrolled in Physics 311 (212). Sem hrs: 3 spring.

**Physics 380. Weather Forecasting Techniques** 1(1)
Daily discussion of current weather over continental U.S.; local area forecasts and debriefs. Short range weather forecasting techniques to include: local peculiarities, objective aids, role of convergence and divergence, temperature advection, thickness patterns, and vorticity. Flight forecasting for aircraft operations. Final exam. Prereq: Physics 250. Sem hrs: 3 fall.

**Physics 382. Laser Physics and Lights** 1(1)
Theory of laser operation. Optical phenomena including interference, polarization, coherence, and absorption. Solid-state, liquid, chemical, and gaseous lasers. Various applications including weapons, communications, and holography. Final exam. Prereq: Physics 311 (212). Sem hrs: 3 spring.

**Physics 391. Optics** 1(1)
Topics in geometrical optics including reflection, refraction, lenses, mirrors and optical instruments. Discussions of physical optics including interference, diffraction, absorption, scattering, polarization and optical spectra. Selected topics in contemporary optics such as non-linear optics and lasers. Final exam. Prereq: Completed or enrolled in Physics 311. Sem hrs: 3 fall of even years only.

**Physics 411. Modern Physics** 1(1)
Review of the inter-relationships among science and engineering core courses with emphasis on the unifying role of physics and the conservation laws. Introduction to selected topics in modern physics including the concepts and development of physics since 1890. Topics include special relativity, quantum mechanics, radioactivity, and nuclear physics. Final exam. Prereq: Physics 311; 1/C standing or department permission. Sem hrs: 3 fall or spring.

**Physics 441. Laboratory Techniques** 1(2)
Basic introduction to laboratory skills and techniques to develop instrumental techniques and reinforce concepts of physical behavior. No final. Prereq: Physics 311 (212). Sem hrs: 3 spring.

**Physics 442. Advanced Physics Lab** 1(2)
Selected experiments to develop laboratory skills and reinforce the concepts of physical ideas. No final. Prereq: Physics 441 or department permission. Sem hrs: 3 fall.

**Physics 445. Atmospheric Physics I** 1(1)
Principles of atmospheric thermodynamics for dry air. Thermodynamics of water vapor and moist air. Thermodynamic diagrams. Hydrostatic equilibrium and stability. Solar and terrestrial radiation. Equations of motion for rotating earth. Horizontal motion under balanced forces. Final exam. Prereq: Complete or enrolled in Physics 250. Sem hrs: 3 fall.

**Physics 446. Atmospheric Physics II** 1(1)
Kinematics of fluid flow. Mechanism and influence of pressure changes. Atmospheric discontinuities. Circulation, vorticity and divergence theorems. Turbulence and diffusion. Atmospheric energetics. Numerical forecasting techniques. The general circulation. Final exam. Prereq: Phys 445. Sem hrs: 3 spring.

**Physics 459. Quantum Mechanics** 1(1)
Postulation basis of quantum mechanics. Techniques of solution of the wave equation, operators, angular momentum, harmonic oscillator, and hydrogen atom. Quantum theory applied to physical problems. Final exam. Prereq: Physics 358 and Physics 364. Sem hrs: 3 fall.

**Physics 461. Electromagnetic Theory I** 1(1)
Development of the basic principles underlying electromagnetic waves including electrostatic fields in both vacuum and in dielectrics, the Laplace and Poisson equations, magnetic fields associated with constants and time varying currents, and magnetic materials. Maxwell's equations are developed. Final exam. Prereq: Physics 311 (212), Math 330 or Physics 358. Sem hrs: 3 fall.

**Physics 462. Electromagnetic Theory II** 1(1)
Applications of Maxwell's equations: plane waves, reflection, refraction, guided waves, electric and magnetic dipoles and quadrupoles, and antennas. The interaction between plane waves and plasmas is treated. Final exam. Prereq: Physics 461 in the preceding semester. Sem hrs: 3 spring.

**Physics 465. Statistical Physics** 1(1)
Quantum statistical mechanics as an underlying theory of systems in contact. Applications include low temperature physics, magnetism, boson and fermion gases, ideal gases, kinetic theory, and thermodynamics. Final exam. Prereq: Physics 364 or department permission. Sem hrs: 3 spring.

**Physics 495. Special Topics** 1(1)
Selected topics in physics. Final exam or final report. Prereq: Department permission. Sem hrs: 3. Offering time determined by department.

**Physics 499. Independent Study** 1(0)
Individual research under the direction of a faculty member. Final report. Prereq: Department permission. Sem hrs: 3 fall or spring.

## Political Science (Pol Sci)

*Offered by the Department of Political Science*

**Pol Sci 200. Introduction to Government** ½(1X)
As a first course in political science, this offers a survey of the evolution of Western political thought in order to explain the chief contemporary ideologies and forms of government. Examples of the ideologies and governments in the world today are included. Foundations are established for subsequent study of American government, international relations, and more specialized topics in political science. Final exam. Sem hrs: 1½ fall or spring. (Not offered second half of spring semester.)

**Pol Sci 201. American National Government** ½(1X)
Building on the concepts and information in Pol Sci 200, this course concerns the political behavior of Americans and the structure and function of our national governing institutions. Final exam. Prereq: Pol Sci 200 (201). Sem hrs: 1½ fall or spring. (Not offered first half of fall semester.)

**Pol Sci 203. The International Political System** ½(1)
This segment of the introductory sequence is devoted to the study of the relations between nations, with emphasis on the structure and characteristics of the contemporary international political system. Final exam. Prereq: Pol Sci 201. Sem hrs: 1½ fall or spring. (Not offered second half of fall semester.)

**Pol Sci 232. Comparative Politics** 1(1)
The transition from feudalism to capitalism and the emergence of the modern bureaucratic state. The political systems of the United States, Britain, France, Germany, Japan, Soviet Union, China, and other countries are covered. Topics for discussion include leadership, organizational, and ideological aspects of sociopolitical change and the relative merits of revolutionary violence or reformist, incremental strategies in effecting fundamental transformations of societies. Final exam. Sem hrs: 3 fall.

**Pol Sci 349. Political Analysis** 1(1)
Introduction to the philosophical and methodological foundations of contemporary political science. Emphasis on current research methods in domestic and international politics: interview/survey research, content analysis, simulation and experimentation, and

systematic case studies. Research paper. Prereq: Pol Sci 200. Sem hrs: 3 spring.

**Pol Sci 352. Political Theory** 1(1)

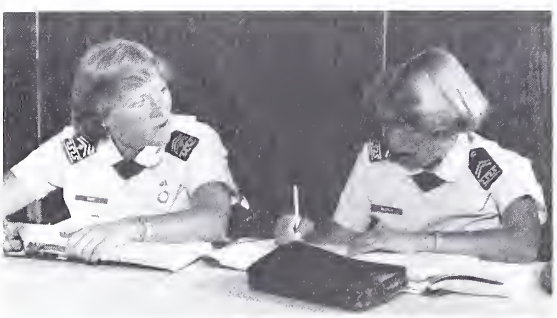
An overview of political thought from the ancient Greeks to the present with a brief introductory section on classical political theory. The consideration of basic political problems such as equality, freedom, justice, power, and the ideal government in terms of how political theorists dealt with them in the past and how these problems relate to the present. Research paper. Prereq: Pol Sci 200. Sem hrs: 3 fall.

**Pol Sci 371. Political Parties and the Democratic Process** 1(1)

An in-depth view of the dynamics of American politics within the party system. Emphasis on party functions, components, types, ideologies, membership, organization, leadership selection, financing and discipline. Last portion of the course devoted to issues of campaigning and reform. Final exam. Prereq: Pol Sci 200. Sem hrs: 3 fall.

**Pol Sci 383. American Foreign Policy: Process and Issues** 1(1)

Analysis of U.S. foreign policy in the post-1945 period. Examination of the policy-making environment and the roles of the President, the Department of State, the Congress, and various executive departments. Case studies. Final exam. Prereq: Pol Sci 203 (212). Sem hrs: 3 fall.



**Pol Sci 385. Defense and Public Administration** 1(1)

Analyzes the formulation and execution of public policy in America as a bureaucratic phenomenon. Includes study of organization theory, administrative process, structure of U.S. federal administrative establishment, decision-making theory, bureaucratic politics, and policy process and policy analysis. Concludes with a study of the administration of actual public programs and a concentration on issues of public management. Research paper. Prereq: Pol Sci 200. Sem hrs: 3 spring.

**Pol Sci 412. Defense Policy** 1(1)

Relationships among military policy, foreign policy, and national security policy. Formulation of defense policy in terms of external threats, American political climate, and impact of military technology. Institutional machinery for making strategy. Final exam. Prereq: Pol Sci 203 (212) or department permission. Sem hrs: 3 fall or spring.

**Pol Sci 421. Political Violence and Revolutionary Change** 1(1)

Focuses on the use of organized violence by non-governmental groups designed to achieve political objectives of various kinds, the social conditions underlying such actions, the factors which account for the success or failure of these efforts, and the resulting effects on the larger socio-political context. Particular emphasis is placed on revolution and agitational terrorism. Final exam. Prereq: Pol Sci 203 (212). Sem hrs: 3 fall.

**Pol Sci 441. Senior Seminar in International Relations** 1(1)

Theories of international relations and the formulation of foreign policy. Consideration of issue areas relevant to policy formulation such as the use of force in international relations, international political economy, international organization, transnationalism, and future world order. Research paper. Prereq: 1/C standing or department permission. Sem hrs: 3 fall.

**Pol Sci 442. Senior Seminar in American Politics and Public Policy** 1(1)

Examines the contributions of political institutions and processes to American policy-making. Introduces basic concepts of policy studies. Focuses on issues facing the U.S. in an attempt to gain an understanding of the policy-making process. Research paper. Prereq: 1/C standing or department permission. Sem hrs: 3 spring.

**Pol Sci 460. Comparative Defense Policy** 1(1)

A comparative study of selected defense policies and policy making with emphasis on the Soviet Union, China, selected Western European states, Japan and India. Case studies examine variations in doctrine, weapons acquisition, and force deployment and use. Final exam. Prereq: Pol Sci 203 (212). Sem hrs: 3 spring.

**Pol Sci 472. Politics of the USSR** 1(1)

Studies the communist system of government emphasizing both the internal political processes and external relations of the USSR. The effects of ideology, national interest, internal forces, and foreign relations are analyzed. In the examination of foreign policy, emphasis is placed on the post-1945 era. Final exam. Prereq: Pol Sci 203 (212). Sem hrs: 3 fall, 1979. (Not offered in 1980.)

**Pol Sci 473. Politics of Asia** 1(1)

Surveys government and politics of selected countries in East Asia with emphasis on China and Japan. Includes examination of China's expanding power and influence, implications of a resurgent Japan, and other current Asian issues. Final exam. Prereq: Pol Sci 203 (212). Sem hrs: 3 fall.

**Pol Sci 474. Politics of Western Europe** 1(1)

Political developments in Western Europe from the Marshall Plan to the present. Examines institutional arrangements and political strategies of major Western European nations. Considers potential of a united Europe as a third force. Final exam. Prereq: Pol Sci 203 (212). Sem hrs: 3 spring.

**Pol Sci 476. Politics of Latin America** 1(1)

Comparative study of selected Latin American political systems. Fundamental factors affecting political

stability in Latin America; the inter-relationship of economic, military, political, and social factors in the growth of Latin American political systems; and the inter-hemisphere relations. Final exam. Prereq: Pol Sci 203 (212). Sem hrs: 3 spring.

**Pol Sci 478. Politics of Africa and the Middle East** 1(1)

Analysis of the major political trends within Africa and the Middle East during the 20th Century. The colonial epoch, independence era, contemporary political systems, and major issues in conflict are surveyed. Research paper. Prereq: Pol Sci 203 (212). Sem hrs: 3 spring.

**Pol Sci 482. Congress** 1(1)

The study of Congress as a political institution. Topics include elections, member relations with constituents, policy roles, leadership, the committee system, seniority, procedures, and oversight of administrative agencies. Field trip to Denver is required, either to view the Colorado state legislature or to visit district congressional offices. Final exam. Prereq: Pol Sci 200. Sem hrs: 3 fall.

**Pol Sci 484. The Presidency** 1(1)

An in-depth study of the American Presidency, with emphasis on the office of the Presidency, Presidential selection, roles of the President, and the personalities and working styles of the modern presidents. Final exam. Prereq: Pol Sci 200. Sem hrs: 3 spring.

**Pol Sci 495. Seminar in Political Science** 1(1)

Selected topics in political science. Spring 1980 offering: Arms Control Today. Fall 1980 offering: American Democracy in Action: The 1980 Election. Spring 1981 offering: Intelligence and Politics. Final exam or final report. Prereq: Department permission. Sem hrs: 3 fall or spring.

**Pol Sci 499. Independent Study** 1(0)

Individual study or research in a carefully selected topic conducted on a tutorial basis. Research paper or directed reading. Prereq: Department permission. Sem hrs: 3 fall or spring.

## Professional Military Studies (Pro Mil Stu)

*Offered by the Deputy Commandant for Military Instruction*

**Pro Mil Stu 110. Introduction to Military Studies** 0(1)

An introductory, definition course in the study of the mission, organization and operation of the USAF. Introduces cadets to the military ethic and the professionalism necessary to build a foundation for a career as an Air Force officer. Emphasizes the operation of the DOD and the Air Force's role in support of national objectives. Offers an insight into the responsibilities of officers in accomplishing these goals. Provides a background essential to prepare the student for increased cadet responsibilities and later military career. Final exam. Sem hrs: 2 fall or spring.

**Pro Mil Stu 220. Air Force Organizational Communication** 0(1)

An introduction and practicum in military communication application and analytic skills expected of the junior Air Force officer. Through a fictional wing-base organization, cadets prepare and critique a variety of written and oral communications. Case studies highlight formal programs of internal and military-civilian communication. Guest speakers and a field trip provide vivid direct experience with contemporary programs and the mass media as important elements in civil-military relations. Prereq: 3/C standing. Final exam. Sem hrs: 2 fall or spring.

**Pro Mil Stu 330. United States Force Employment Concepts** 0(1)

A survey of U.S. military doctrine and employment concepts. Students relate basic doctrine to current force structure and employment concepts, then analyze selected tactical force employment issues through exercises and student presentations. Final report. Prereq: 2/C standing. Sem hrs: 2 fall or spring.

**Pro Mil Stu 440. Military Theory and Force Analysis** 0(1)

Provides the foundation of professional military thought upon which the students will be able to build throughout their military careers. Surveys the writings of significant military theorists and evaluates national military forces. The concept of military balances is then examined through analysis of the Central European situation. Discusses contemporary concepts including the characteristics of the modern battlefield and current/recent conflicts. Final exam. Final report. Prereq: PMS330. Sem hrs: 3 fall or spring.

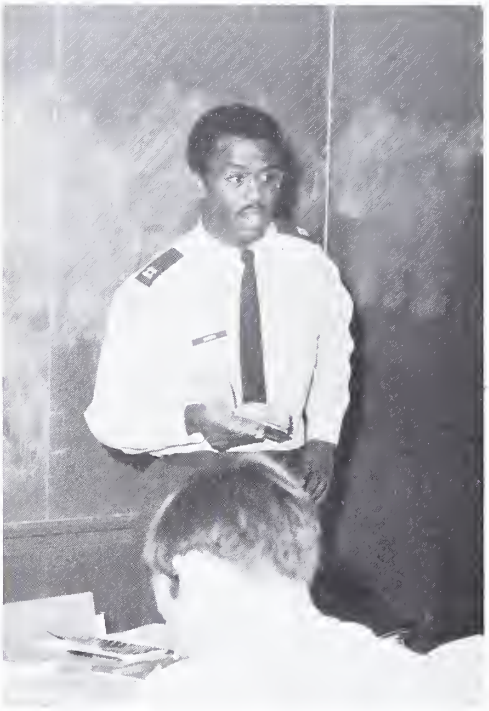
**Pro Mil Stu 495. Special Topics** 0(2XX)

Selected topics pertaining to the military. No final. Prereq: Department permission. Sem hrs: 3 fall or spring.

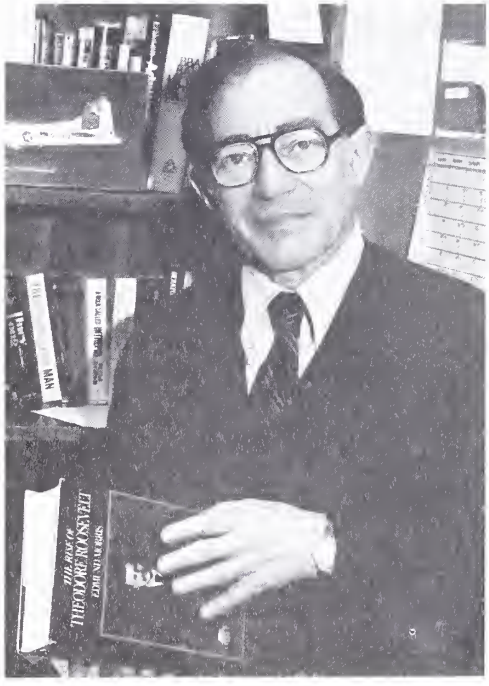
**Pro Mil Stu 499. Independent Study** 0(0)

Individual study and/or research under the direction of a military science instructor. No final. Prereq: Department permission. Sem hrs: 3 fall or spring.

*The 1980 Helmer award for excellence in teaching and management was presented to: Lt Col Bill Weida, Maj Tom Jonak and Maj Roger Colgrove.*



*Capt Curtis Martin, English instructor, won the 1980 William P. Clements Jr award for excellence in education.*



*Dr Lawrence F. Silverman, Department of Behavioral Sciences and Leadership, is one of six visiting professors.*

*Maj Jim Rehkop and T/Sgt Sikora, Aviation Sciences, plan and present the Planetarium shows.*

# ACADEMIC MAJORS

Some of the majors specify open options and/or academic divisional options in identifying graduation requirements. These are defined as follows:

*An Open Option:* Any graded course under supervision of the Dean of the Faculty for which at least two semester hours credit is awarded. Open options also include Armnshp 440, Aviation 470, Aviation 490, Aviation 495, Aviation 499, Nav 471, and all Science courses under supervision of the Commandant of Cadets; Phy Ed 440, Phy Ed 450, Phy Ed 460, and Phy Ed 499 under supervision of the Director of Athletics.

*An Academic Divisional Option:* Any course unit from the offerings of the Basic Sciences, Engineering Sciences, Social Sciences or Humanities Divisions.

## Aeronautical Engineering Major

*Administered by the Department of Aeronautics*

The Aeronautical Engineering major is a sequence of courses in which cadets may emphasize aircraft flight mechanics, propulsion, aerodynamics or structures. Cadets who successfully complete this major are awarded the degree of Bachelor of Science in Aeronautical Engineering.

In addition to the core curriculum, the following courses are required for the major:

Aero 356. Flight Mechanics I
Aero 371. Aerodynamics I
Aero 372. Aerodynamics and Design
Aero 450. Aeronautical Laboratory
Aero 461. Propulsion I
Aero 471. Aerodynamics II
Math 351. Applied Differential Equations

Two course units of either Aircraft Design (Aero 464) or Propulsion Design (Aero 466)

Two course units selected from offerings of the Engineering or Basic Science Divisions

## Astronautical Engineering Major

*Administered by the Department of Astronautics and Computer Science*

The Astronautical Engineering major is the broad application of science and engineering to aerospace operations. Special emphasis is placed on astrodynamics, aerospace systems design, and control systems including weapon delivery systems. Thus, the student is prepared for Air Force duty with specialization in research, design, development, and analysis of space tech-

nology and aerospace avionics. Cadets who successfully complete this major are awarded the degree of Bachelor of Science in Astronautical Engineering.

In addition to the core curriculum, the following courses are required for the major:

Aero 356. Flight Mechanics I
Astro 450. Principles of Aerospace Guidance
Astro 451. Astrodynamics
Astro 452. Linear Control Systems Analysis and Design
Astro 453. Advanced Astrodynamics
Astro 454. Inertial Navigation and Guidance
Math 351. Applied Differential Equations
Mech 320. Dynamics
Engr 350. Linear Systems Analysis and Design

A two course unit design sequence in control systems or space vehicles

## Aviation Sciences Major

*Administered by the Departments of Astronautics and Computer Science, Aeronautics, and Physics*

The Aviation Sciences major is designed to provide a broad program of study with nearly equal emphasis in the various disciplinary areas. It is intended to prepare the cadet for widely varied Air Force duties and graduate educational opportunities without special orientation to any single academic discipline at the undergraduate level.

In addition to the core curriculum, eleven majors courses are required, consisting of one course from each of the eleven categories below, with not more than three courses overall from any single discipline in the first eight categories. Any course may be counted toward only one of the eleven categories.

1. *The Military Profession*

Beh Sci 464. Organizational Behavior Practicum
Beh Sci 490. Counseling
Beh Sci 390. The Military in Evolving Society
Mgt 361. Personnel Management and Industrial Relations
Pol Sci 495. Seminar in Political Science
Philos 495. Seminar in Philosophy
Hist 494. The American Way of War

2. *Heritage and Values*

Hist 480 History of the American Way of Life
Hist 371 Air Power and Modern Warfare
Law 451. American Constitutional Law
Philos 400. Great Religions of the World
Hist 382. Science, Technology and Warfare
Area Studies 351. The American Identity
Geog 350. Cultural Geography

3. *National Security Issues*

Econ 374. Survey of International Economic Issues
Pol Sci 421. Political Violence and Revolutionary Change
Pol Sci 383. American Foreign Policy: Process and Issues
Pol Sci 460. Comparative Defense Policy
Hist 363. Unconventional Warfare
Law 461. International Law
Geog 370. Political Geography

4. *Management*

Econ 477. Defense Economics
Law 462. Government Contract Law
Mgt 346. Organizational Theory
Mgt 472. Defense Management Policy
Mgt 485. Systems Acquisition and Management

5. *Analytical Methods*

Mech 320. Vector Engineering Mechanics
Math 371. Introduction to Operations Research
Math 358. Statistics (Math 357 taken as a core-substitute for Math 220)
Math 351. Applied Differential Equations
Mgt 331. Statistical Decision Methods
Chem 222. Analytical Chemistry
Comp Sci 380. Software Engineering Fundamentals
Geog 340. Cartography

6. *Environment*

Physics 250. Introduction to Atmospheric Physics
Physics 370. Introductory Space Science
Geog 340. Cartography
Geog 370. Political Geography
Geog 372. Economic Geography
Astro 371. Descriptive Astronomy
Chem 381. Chemistry of the Environment
Bio Sci 380. Bioenvironmental Science
Geog 353. Physical Geography

7. *Systems*

Astro 395. Aerospace Flight Simulation
Engr 350. Linear Systems Analysis and Design (Corequisite Math 351)
Av 490. Avionics Concepts and Systems Development
El Engr 480. Studies in Military Engineering
Comp Sci 362. Computer Simulation (Prerequisite Math 357 or Math 220 with department permission)

8. *Aviation Technology*

| | |
|---|---|
| Aero 356. | Flight Mechanics I |
| Aero 434. | Aircraft and Engine Performance Laboratory |
| Aero 461. | Propulsion I (Prerequisite Aero 371) |
| Aero 371. | Aerodynamics I |
| Civ Engr 481. | Air Base Engineering |
| Geog 382. | Geographic Application of Analysis |
| Mech 331. | Aircraft Structures |

9. *Airmanship/Navigation*

| | |
|---|---|
| Av 490. | Avionics Concepts and Systems Development |
| Nav 471. | Advanced Applied Navigation |
| Open Option. | Any academic course which does not fulfill a core requirement |

10. *English*

English 370. Speech

11. *Aviation Sciences*

Option. Any additional course offered in first eight categories of this major

## Basic Sciences Major

*Administered by the Basic Sciences Division*

The major in Basic Sciences is designed for the student with an interest in the broad scope of science. It allows the cadet to sample a range of scientific areas with a limited degree of specialization in the area of greatest interest. Departmental options must be chosen from offerings of the Departments of Chemistry and Biological Sciences, Mathematical Sciences and Physics. The science options are courses selected from the basic and engineering science field, including a total of 12 disciplines.

In addition to the core curriculum, the following courses are required for the major:

Two course units from the offerings of one of the departments listed in the Basic Sciences Division

Two course units from the offerings of a second of the three departments in the Basic Sciences Division

One course unit from the offerings of the third department in the Basic Sciences Division

Two course units from the offerings of the Basic or Engineering Sciences Division

One academic divisional option; one open option

## Behavioral Sciences Major

*Administered by the Department of Behavioral Sciences and Leadership*

The major in Behavioral Sciences provides the cadet with the facility for understanding human behavior, the capability of handling human problems throughout his career as an Air Force officer, and the basis for his continuing development as a military leader. The major is divided into three areas of emphasis: Individual Behavior, Organizational Behavior, and Human Factors Engineering. The factual knowledge and concepts developed are contemporary in scope and of particular importance to the education of all officers in operational command positions and those contemplating a career in behavioral science research, human factors engineering, personnel psychology, social actions, clinical psychology, and organizational behavior.

In addition to the core curriculum, the following three courses are required for all areas of emphasis in this major:

| | |
|---|---|
| Beh Sci 331. | Statistical Tests and Measurements |
| Beh Sci 352. | Social Psychology |
| Beh Sci 435. | Learning |
| Beh Sci 360. | Sociology |

There are different course requirements for each area:

*Individual Behavior*

| | |
|---|---|
| Beh Sci 350. | Psychobiology |
| Beh Sci 351. | Cultural Anthropology |
| Beh Sci 360. | Sociology |
| Beh Sci 372. | Experimental Psychology |
| Beh Sci 380. | Psychology of Individual Behavior |
| Beh Sci 490. | Counseling |

Academic divisional option; open option

*Organizational Behavior*

| | |
|---|---|
| Beh Sci 351. or 360 | Cultural Anthropology or Sociology |
| Beh Sci 464. | Organizational Behavior and Development |
| Beh Sci 477. | Industrial and Organizational Psychology |
| Beh Sci 490. | Counseling |
| Mgt 346. | Organizational Theory |
| Mgt 361. | Personnel Management and Industrial Relations |

Academic divisional option; open option

*Human Factors Engineering*

| | |
|---|---|
| Beh Sci 351. or 360. | Cultural Anthropology or Sociology |
| Beh Sci 350. | Psychobiology |

Beh Sci 372. Experimental Psychology
Beh Sci 470. Human Factors and Perceptual Processes
Beh Sci 477. or 499. Industrial and Organizational Psychology or Independent Study
Civ Engr 481. Air Base Engineering
Academic divisional option; open option.

## Biological Sciences Major

*Administered by the Department of Chemistry and Biological Sciences*

The major in Biological Sciences is intended for the student whose abilities and talents lie in any area of biological science. It provides cadets the undergraduate prerequisites for the advanced training required for admission into biologically-oriented career fields. The use of laboratory methods is emphasized for reinforcement of lecture material and for individual research projects. This major also provides for an interdisciplinary approach in the areas of environmental sciences and physical education.

In addition to the core curriculum, the following courses are required for the major:

Bio Sci 330. Introduction to Biological Sciences
Bio Sci 331. Botany and Zoology
Bio Sci 380. Bioenvironmental Science
Four additional Biological Sciences course units.
Three academic divisional options; one open option

## Chemistry Major

*Administered by the Department of Chemistry and Biological Sciences*

The major in Chemistry is recommended for those who are interested in chemical or biochemical research or applications. It provides fundamental knowledge in analytical, inorganic, organic, and physical chemistry and allows the cadet to select one or two of these areas for advanced study. The standard sequence is designed to prepare students for a junior officer position in research, development, or graduate training. It emphasizes the use of laboratory methods for reinforcement of lecture material and individual research projects. Cadets successfully completing this sequence are awarded the degree of Bachelor of Science in Chemistry.

In addition to the core curriculum, the following courses are required:

Chem 222. Analytical Chemistry (only required for those who do not take Chem 101-102 or Chem 121-122)
Chem 233-234. Organic Chemistry I and II
Chem 243-244. Organic Chemistry I and II Lab
Chem 335-336. Physical Chemistry I and II
Chem 345-346. Physical Chemistry I and II Lab
One of the following courses:
Chem 431. Theoretical Inorganic Chemistry
or
Chem 434. Biochemistry
Chem 453. Instrumental Chemistry
One science course unit selected with approval of the faculty advisor

This sequence fulfills the recommendations of the Committee on Professional Training of the Americal Chemical Society. Cadets in this major should take German or Russian to satisfy the core language requirement.

An alternate sequence in General Chemistry reduces the number of laboratory courses and is designed for students wishing to combine an emphasis in chemistry with advanced courses in other disciplines. While this sequence does not fulfill the requirements for the Bachelor of Science in Chemistry specified by the American Chemical Society, it does allow a degree in an interdisciplinary program tailored to various Air Force careers.

In addition to the core the following are required:

Chem 233-234. Organic Chemistry I and II
Chem 243. Organic Chemistry Lab
Chem 335-336. Physical Chemistry I and II
Chem 345. Physical Chemistry Lab
One of the following courses:
Chem 222. Analytical Chemistry
or
Chem 244. Organic Chemistry Lab
or
Chem 346. Physical Chemistry Lab
or
Chem 453. Instrumental Chemistry
Any 400 level chemistry course
Two science options; one open option

## Civil Engineering Major

*Administered by the Department of Civil Engineering*

The major in Civil Engineering provides a well balanced program stressing the fundamentals common to the many areas of the civil engineering profession. The major is designed to prepare cadets for duty in the Air Force with some specialization in the civil engineering discipline including research, development, design, and construction of facilities to support manned and unmanned weapon systems and the space program. The major provides excellent preparation for graduate study in any of the civil engineering areas. Cadets successfully completing this major are awarded the degree of Bachelor of Science in Civil Engineering.

In addition to the core curriculum, the following courses are required for the major:

Civ Engr 361. Fundamental Hydraulics
Civ Engr 381. Engineering Measurements and Construction
Civ Engr 372. Behavior and Analysis of Structures
Civ Engr 392. Soil Mechanics
Civ Engr 454. Structural Dynamics
Civ Engr 471. Behavior and Design of Concrete Members
Civ Engr 472. Behavior and Design of Steel Members
Math 351. Applied Differential Equations
Mech 320. Dynamics

One civil engineering related course selected from the following:

Civ Engr 462. Water Supply and Waste Disposal
Civ Engr 473. Structural Design
Civ Engr 491. Foundation Engineering

One course from the offerings of the Basic Sciences or Engineering Sciences Divisions

## Computer Science Major

*Administered by the Department of Astronautics and Computer Science*

The major in Computer Science provides a broad background in computer programming, languages, systems, and applications with emphasis on electronic digital computers. The major provides officers who are highly qualified in the rapidly growing areas of computer research, computer management, and the application of computers to complex scientific, engineering, information and management problems.

In addition to the core curriculum, the following courses are required for the major:

Comp Sci 351. Computer System Organization
Comp Sci 356. Computer Architecture and Performance Evaluation
Comp Sci 362. Computer Simulation
Comp Sci 380. Software Engineering Fundamentals
Comp Sci 453. Design I
Comp Sci 454. Design II
Comp Sci 467. Computer Networks and Communication
Math 341. Introductory Numerical Analysis

One computer science related course unit selected from a list of approved Computer Science options.

Two courses in one of three sequences: Management Applications, Scientific Applications, or System Software.

MANAGEMENT APPLICATIONS

Comp Sci 463. Data Base Management
Mgt 460. Operations Analysis I
or
Mgt 485. Systems Acquisition and Management

SCIENTIFIC APPLICATIONS

Comp Sci 473. Digital Control
Comp Sci 474. Mini-Micro-Graphics

SYSTEM SOFTWARE

Comp Sci 483. Operating Systems
Comp Sci 484. Programming Systems

## Economics Major

*Administered by the Department of Economics, Geography and Management*

The major in Economics is designed to provide the cadet with the capability of performing economic analysis, especially to resource allocation problems associated with national security. The major is constructed on a solid foundation of economic theory and is extended by training in quantitative analysis techniques and by study in alternative specialized fields of the economics discipline.

In addition to the core curriculum, the following courses are required for the major:

| | |
|---|---|
| Econ 333. | Price Theory |
| Econ 356. | Macroeconomic Theory |
| Econ 465. | Introduction to Econometrics |
| Econ 478. | Seminar in Defense Economics |
| Mgt 331. | Statistical Decisions in the Management Environment |

Five course units approved by the major advisor.

One open option

## Electrical Engineering Major

*Administered by the Department of Electrical Engineering*

The Electrical Engineering major provides an opportunity to study the electrical and electronic generation, transmission, and processing of information. Emphasis is given to the fundamental concepts which find wide applicability and use in the Air Force weapons and support systems. This program is of particular value to cadets who will pursue Air Force careers in research and development, operations, and communications-electronics. Cadets who successfully complete this major are awarded a Bachelor of Science in Electrical Engineering.

In addition to the Core Curriculum, with El Engr 340 as a substitute for El Engr 310, the following courses are required for the major:

| | |
|---|---|
| El Engr 341. | Electronics I |
| El Engr 342. | Electronics II |
| El Engr 346. | Signal and System Analysis |
| El Engr 443. | Electromagnetics |
| El Engr 464. | Design |
| Math 330. | Applied Vector Analysis |
| El Engr 351.* | Laboratory Techniques |
| El Engr 352.* | Electronics Laboratory |
| El Engr 465.* | Design Laboratory |
| El Engr Opt | (See Supplemental Information) |
| El Engr Opt | |
| El Engr Opt | |
| Science Opt | 1 course unit offered by the Basic or Engineering Sciences Division selected with approval of the faculty advisor. |

One Unit of Flight Core

*Three one-semester hour labs.

Supplement Information

The El Engr elective options are to be selected from the following list of courses. Options are subject to meeting course prerequisites and to advisor approval.

| | |
|---|---|
| El Engr 380. | (Modern Logic Design) |
| El Engr 447. | (Communications Systems) |
| El Engr 448. | (Data Communications) |
| El Engr 449. | (Introduction to Optical Electronics) |
| El Engr 487. | (Real-Time Computation) |
| El Engr 488. | (Microprocessor Systems) |
| Astro 452. | (Linear Control System Analysis and Design) |

## Engineering Major

*Administered by the Department of Civil Engineering*

The major in Engineering is designed for the student whose ability and interests lie in the area of the engineering sciences, but who has not selected an area of specialization in one of the engineering disciplines or who has an interest in an area of engineering that requires a broad engineering background. This major provides a broad education in the engineering sciences as preparation for effective performance in the technical specialties and for future graduate study in engineering. Cadets who successfully complete this major are awarded the degree of Bachelor of Science.

In addition to the core curriculum, the following courses are required for the major:

| | |
|---|---|
| Aero 356. | Flight Mechanics I |
| El Engr 360. | Instrumentation Systems |
| Mech 320. | Dynamics |
| Engr 350. | Linear Systems Analysis and Design |

Three courses from the offerings of the Engineering Sciences Division or the Department of Mathematical Sciences

One academic divisional option; one open option

## Engineering Mechanics Major

*Administered by the Department of Engineering Mechanics*

The major in Engineering Mechanics is designed to provide engineers with a broad base of knowledge in fundamental engineering with depth in the areas of dynamics, stress analysis, or materials engineering. The major provides an excellent foundation for further education in a variety of fields. Cadets who successfully complete this major are awarded the degree of Bachelor of Sciences in Engineering Mechanics.

In addition to the core curriculum, the following courses are required for the major:

Aero Option Aero 356 - Flight Mechanics I or
Aero 363 - Heat Transfer
Math 351. Applied Differential Equations
Mech 320. Dynamics
Mech 331. Aircraft Structures
Mech 332. Aircraft Structural Design
Mech 352. Mechanical Properties of Materials
Mech 461. Experimental Mechanics

Three courses in one of two sequences:

Structures Sequence

Mech 462. Engineering Design
Mech 432. Advanced Structural Mechanics
Mech 420. Vibrations
or
Mech 495 Special Topics

Materials Sequence

Mech 342. Introductory Metallurgy
Mech 451. Physical Metallurgy
Mech 495. Special Topics

One course from the offerings of the Basic Sciences or Engineering Sciences Divisions

## Engineering Sciences Major

*Administered by the Department of Engineering Mechanics*

The major in Engineering Sciences is designed to provide a broad education in the engineering sciences as preparation for effective performance in an engineering specialty and for future graduate study in engineering. Cadets who successfully complete this major are awarded the degree of Bachelor of Science in Engineering Sciences.

In addition to the core curriculum, the following courses are required for the major:

Aero 356. Flight Mechanics I
Aero 371. Aerodynamics I
Engr 350. Linear Systems Analysis and Design
Astro 452. Linear Control Systems Analysis and Design
El Engr 360. Instrumentation Systems
Math 351. Applied Differential Equations
Mech 320. Dynamics
Mech 331. Aircraft Structures

A two course unit design sequence in one of the following areas: Airlift Vehicles, Propulsion, Control Systems, Space Vehicles, Computer Design, Electronics, Structures, Experimental Mechanics, Materials

One course from the offerings of the Basic Sciences or Engineering Sciences Divisions

## Geography Major

*Administered by the Department of Economics, Geography and Management*

The major in Geography provides an understanding of the complex geographic relationships in the world today. This major requires a foundation in both cultural and physical geography. Based on this foundation, a cadet may concentrate in depth in physical, cultural, or regional geography. The geography major is of particular value to those cadets contemplating Air Force careers in operations planning, foreign area analysis, intelligence, or cartography.

In addition to the core curriculum, the following courses are required for the major:

Geog 242. Analytical Techniques in Geography
Geog 320. Principles of Geography
Geog 340. Cartography
or
Geog 382. Geographic Application of Imagery Analysis
Geog 350. Cultural Geography
or
Geog 370. Political Geography
or
Geog 372. Economic Geography
Geog 352. Climatology
or
Geog 353. Physical Geography
Geog 471. Western Europe and the Mediterranean
or
Geog 472. USSR and Eastern Europe
or
Geog 475. Geography of the Developing World/ East Asia and Latin America

Geog 491. Seminar in the Basis of Geographic Thought and Research

Two additional course units in geography

Two additional course units from either geography or offerings related to cadet's area of concentration with approval of faculty advisor

One open option

## History Major

*Administered by the Department of History*

The History major helps cadets understand the world and its problems by studying the ideas and forces of the past that have shaped the present. The knowledge imparted and the perspective developed are important to the education of the professional Air Force officer and are particularly valuable for cadets contemplating careers in operations, plans, attache duty, and intelligence. Because the major emphasizes the development of historical judgment, research techniques, writing skills, and critical thinking, it is excellent management and leadership training for junior officers aspiring to future staff and command positions.

In addition to the core curriculum, the following courses are required for the major:

History 330. Historical Methods
One U.S. History option
One European History option
One Military History/Area History option
Two open options
One academic divisional option
Four course units approved by the advisor in one of the following: Military History; General History; American History; Area History with a concentration in Europe, the Far East, Latin America, the Middle East, or Eastern Europe (Russia)

## Humanities Major

*Administered by the Humanities Division*

The Humanities major introduces cadets to the study of ideas, sharpens their writing and speaking skills, and develops in them an awareness of the perspectives of history, an appreciation for the importance of language, a sensitivity to philosophical inquiry and ethical conduct, and an understanding of the important roles played by literature and the fine arts in the development of the whole man. Thus the major provides excellent leadership training for any future Air Force officer, to include those cadets contemplating careers in flying, weapons control, missiles, maintenance, logistics, law and intelligence — in short, all those fields which demand leadership capable of dealing with the human and technological complexities of an Air Force now approaching the twenty-first century.

In addition to the core curriculum, the major requires the following courses:

One course unit in English from the Department of English
One course unit in History from the Department of History
One course unit in Philosophy from the Department of Philosophy and Fine Arts
One course unit in Fine Arts from the Department of Philosophy and Fine Arts
One course unit in Foreign Language or Humanities from the Department of Foreign Languages
Two Humanities division options; one academic divisional option; one open option

## International Affairs Major

*Administered by the Department of Political Science*

The major in International Affairs is designed to develop Air Force officers with a comprehensive understanding of contemporary political problems and issues. Courses in the major form the basis for Air Force duties across a broad range of fields allowing the officer to be a generalist while also pursuing assignments requiring skills in research and analysis. This major is particularly suited for those cadets who desire to develop careers in operations, plans, intelligence, politico-military affairs, attache duty, and foreign military assistance. Officers in these career fields normally occupy staff and command positions with the Air Force; in unified, specified and combined commands; in the Joint Staff; and in the Department of Defense.

In addition to the core curriculum, the following courses are required for the major:

Pol Sci 232. Comparative Politics
Pol Sci 349. Political Analysis
Pol Sci 352. Political Theory
Six course units approved by the advisor in one of the following areas of concentration: International Politics; Western European, Asian, Latin American, Soviet, Middle Eastern or African Studies; National Security Policy; or American Politics
One academic divisional option; one open option

## Management Major

*Administered by the Department of Economics, Geography and Management*

The major in Management provides the cadet with the tools, techniques, and attitudes that will assist in making significant contributions as a cadet manager and as an Air Force officer. A principal objective is to accelerate the student's ability to act in a mature and meaningful fashion under conditions of responsibility. The decision-making process is the principal environment toward which most of the material is directed.

In addition to the core curriculum, the following courses are required for the major:

Mgt 341. Introduction to Accounting
Mgt 331. Statistical Decisions in the Management Environment
Mgt 346. Organizational Theory
Mgt 360. Survey of Management Science
Mgt 472. Administrative Policy and Strategy
or
Econ 477. Defense Economic Policy
Five course units related to management with approval of faculty advisor
One open option

## Mathematical Sciences Major

*Administered by the Department of Mathematical Sciences*

The major in Mathematical Sciences is designed to provide a thorough background in the techniques of analyzing and solving the complex operations, management, and mathematical problems of today's modern Air Force. Courses in operations research, applied mathematics, and analysis provide depth of education in these basic areas. Mathematical applications are stressed through elective courses in other disciplines. The program provides excellent preparation and flexibility of choice for entering AFIT graduate degree programs in engineering, operations research, the physical sciences, and mathematics.

In addition to the core curriculum, the following courses are required (Math 357 may be substituted for Math 220 in the core):

Math 320. Foundations of Mathematics
Math 360. Linear Algebra
Math 365. Modern Algebra
or
Math 366. Advanced Calculus I
Four Math options
Two Math options and two open options
or
Four applied options
(All options require Math advisor approval)

## Operations Research Major

*Administered jointly by the Department of Mathematical Sciences and the Department of Economics, Geography and Management*

The major in Operations Research is designed to provide the cadet with the academic background necessary for duty as an Air Force scientific analyst as well as for graduate studies in operations research and systems analysis. This interdisciplinary program will appeal to the student who enjoys problem solving and quantitative decision-making and who wishes to prepare to analyze the complex issues in operations, plans, research, and system development so prevalent in today's Air Force.

In addition to the core curriculum, the following courses are required (Math 357 will be substituted for Math 220 in the core):

Comp Sci 362. Computer Simulation
Econ 465. Intro to Econometrics
Econ 466. Seminar in Econometrics
Math 357. Probability with Statistics
Math 358. Statistics
Math 360. Linear Algebra
Mgt 485. Systems Acquisition and Management
or
Mgt 472. Defense Managerial applications
Math 371. Operations Research I
Math 441. Linear Programming
Math 442. Operational Research II
or
Mgt. 360. Survey of Management Sciences
Mgt 460. Management Science I
Mgt 462. Management Science II
Open option

(An Operations Research option must be taken if Math 357 is substituted for Math 220)

## Physics Major

*Administered by the Department of Physics*

The major in Physics concentrates on basic physical principles and mathematics. It provides an excellent academic background for a wide range of technical assignments within the Air Force, particularly in the field of research and development. It also provides a sound basis for graduate work in physics, atmospheric science, related applied sciences, and a wide variety of engineering science disciplines. The major is divided into three areas of emphasis: physics, atmospheric physics, and engineering physics.

In addition to the core curriculum, with Physics 363 as a substitute for Physics 411, the following courses are required for the major:

Math 351. Applied Differential Equations
Physics 357. Classical Mechanics I
Physics 358. Classical Mechanics II
Physics 364. Introduction to Modern Physics II
Physics 441. Laboratory Techniques
Physics 461. Electromagnetic Theory
and the courses listed under one of the three areas below

*Physics*

Math Option. Course units offered by the Department of Mathematical Sciences
Physics 442. Advanced Physics Lab
Physics 459. Quantum Mechanics
Physics 462. Electromagnetic Theory II
Physics 465. Statistical Physics
or
Physics 449. Independent Study
or

*Atmospheric Physics*

Physics 250. Introduction to Atmospheric Physics
Physics 352. Physical Processes of the Atmosphere
Physics 445. Atmospheric Physics I
Physics 446. Atmospheric Physics II
Physics Option. Course unit offered by the Department of Physics
or

*Engineering Physics*

Math 455. Advanced Engineering Mathematics
An approved four-course design sequence in engineering or a related science.

## Social Sciences Major

*Administered by the Social Sciences Division*

The major in Social Sciences is designed for the cadet whose interests and abilities lie in the area of the social sciences but who prefers a broader background than a major in only one discipline would provide. The major requires completion of at least one course, as indicated below, beyond the core in each of the following disciplines: economics, geography, management, political science, law and behavioral science. More concentrated study in one discipline may be attained through the use of academic divisional options.

In addition to the core curriculum, the following courses are required for the major:

One Economics course from the following options:
Econ 333. Price Theory
or
Econ 351. Comparative Economic Systems
or
Econ 374. Survey of International Economic Issues
or
Econ 356. Macroeconomic Theory
Geog 320. Principles of Geography

One Management course from the following options:
Mgt 346. Organization Theory
or
Mgt 360. Survey of Management Sciences
or
Mgt 361. Personnel Management and Industrial Relations
or
Mgt 341. Introduction to Accounting and Organizations

One Political Science course from the following options:
Pol Sci 232. Comparative Politics
or
Pol Sci 383. American Foreign Policy: Process and Issues
or
Pol Sci 385. Public Administration and U.S. Public Policy

One course unit in law
One course unit in behavioral science
Two social science options
One open option

# PERSONNEL DIRECTORY

This directory includes personnel on duty during the spring semester, 1980.

*Lt Gen Tallman*

**Superintendent**
LT GENERAL KENNETH L. TALLMAN
BS, United States Military Academy; MS, George Washington University

**Mobilization Augmentee to the Superintendent**
MAJ GEN FRANK E. HUMPERT
BA, University of California, Berkeley; MA, Troy State University

**Dean of the Faculty**
BRIG GENERAL WILLIAM A. ORTH
BS, United States Military Academy; MS, Purdue University; PhD, Brown University

**Commandant of Cadets**
BRIG GENERAL THOMAS C. RICHARDS
BS, Virginia Polytechnic Institute; MA, Pennsylvania State University

**Director of Athletics**
COL JOHN J. CLUNE
BS, United States Naval Academy; MS, University of Southern California

**Director of Admissions and Registrar**
COL WARREN L. SIMMONS
BS, Syracuse University; MS, California Institute of Technology

**Commander USAF Academy Preparatory School**
COL BEN M. POLLARD
BS, MS, Purdue University

**Chief of Staff**
COL JAMES M. DUNN, JR.
BGE, University of Nebraska; MS, George Washington University

## ACADEMY STAFF

**Deputy Chief of Staff/Personnel**
COL JOHN K. ENGLAND, JR.
BS, Texas A&M University; MA, George Washington University

**Deputy Chief of Staff/Comptroller**
COL CLARENCE Y. WILKERSON, JR.
BS, University of Maryland; MBA, Michigan State University

**Deputy Chief of Staff/Civil Engineering**
COL RALPH L. HODGE
BS, University of Maryland; MA, Central Michigan University

**Deputy Chief of Staff/Logistics**
LT COL EDWARD L. PONDER
BS, University of Missouri

**Deputy Chief of Staff/Plans and Operations**
LT COL HOWARD J. RICE
BS, South Dakota State University; MS, Troy State University

**Deputy Chief of Staff/Morale, Welfare and Recreation**
LT COL CHARLES L. MARTIN, JR.
BBA, Manhattan College; MBA, Michigan State University; Certified Internal Auditor

**Command Surgeon**
COL H. ROLAN ZICK
BA, University of Colorado; MD, University of Colorado School of Medicine

**Command Chaplain**
COL LLOYD W. LYNGDAL
BA, Augsburg College; BTh, Augsburg Seminary

**Inspector General**
COL RICHELIEU N. JOHNSON
BS, Tennessee State University; MS, Troy State University

**Staff Judge Advocate**
COL THOMAS J. SPRINGOB
BS, JD, Marquette University; MPA, University of Colorado

**Director of Public Affairs**
LT COL ROBERT W. HUNTER
BS, College of Holy Cross; MA, University of Denver

**Director of Graduate and Gift Programs**
LT COL JAMES F. WHEELER
BS, U.S. Air Force Adademy; MA, University of North Carolina; MS, Air Force Institute of Technology

**Executive Officer**
LT COL CHARLES A. COBLE
BS, University of North Carolina; MS, Auburn University

**Director of Administration**
LT COL EDWARD T. RISTAU
BS, Purdue University

**Director of Computer Resources**
LT COL JERRY B. SMITH
BS, Colorado State University; MS, Southern Methodist University

**Director of Security Police**
LT COL JOSEPH W. HOFFLER
BS, North Carolina Central University; MPA, University of Missouri

**Commander, USAF Academy Band**
MAJ JOHN D. McCORD
BA, Albion College

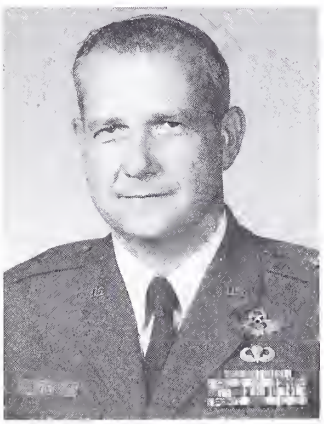
**Director of Protocol**
MAJ DENNIS R. WEDDLE
BFA, Drake University; MS, University of Southern Mississippi

**Director of Communications-Electronics**
MAJ JAMES M. AMODEO
BS, Drake University; MS, University of Nebraska

**Commander Hq Squadron**
CAPT CHARLES A. RUMLEY, JR.
BA, Kansas Newman College; MS, Troy State University

**Director of Social Actions**
CAPT MARTIN L. TATE
BA, Oklahoma State University; MAE, Inter-American University

# DEAN OF THE FACULTY



*Brig Gen Orth*

**Dean of the Faculty and Permanent Professor**
BRIG GEN WILLIAM A. ORTH
BS, U.S. Military Academy; MS, Purdue University; PhD, Brown University

**Vice Dean of the Faculty and Permanent Professor; Chairman of the Engineering Sciences Division**
COL JOHN P. WITTRY
BSAE, St. Louis University; MSAE, Air Force Institute of Technology; AAE, University of Michigan

**Associate Dean of the Faculty and Permanent Professor**
COL MALHAM M. WAKIN
AB, University of Notre Dame; AM, State University of New York; PhD, University of Southern California

**Director of Research and Continuing Education; Associate Professor of Engineering Mechanics**
COL MERLE D. BACON
BS, Wichita State University; MS, PhD, University of Oklahoma

**Director of Faculty Support**
LT COL HARVEY W. SCHILLER
BS, The Citadel; MS, PhD, University of Michigan

**Director of Facility and Equipment Control**
CMSgt ERNEST M. CHAMBLEE
AA, Los Angeles Community College

**Director of Faculty Personnel and Administration**
CMSgt JAMES G. DUNAWAY

**Director of Budget and Cost Control**
MSGT PHILIP A. RANKIN
AA, Maxwell AFB; BS, University of Nebraska, Omaha

**Assistant to the Dean and Permanent Professor**
LT COL JOSEPH MONROE
BS, North Carolina A&T State University; MCS, PhD, Texas A&M University

**Tenure Faculty Executive and Associate Professor of Engineering Mechanics**
LT COL JOHN R. BRUCE
BS, U.S. Naval Academy; MS, Air Force Institute of Technology; MBA, University of Colorado at Colorado Springs

**Assistant to the Dean and Associate Professor of English and Communication**
LT COL WILLIAM J. WALLISCH, JR.
BA, Allegheny College; MA, University of Oklahoma; EdD, University of Southern California

**Assistant to the Dean and Assistant Professor of Spanish**
MAJ MARY A. MARKS
BA, Duke University; MA, Ohio State University

*The Academy faculty is staffed with highly qualified career officers who have received excellent graduate training at a wide variety of universities.*

## Curriculum and Scheduling Services

**Tenure Director of Curriculum and Scheduling Services, Associate Professor of Computer Science**
LT COL JACK L. ANDERSON—BGE, University of Dmaha; MS, Georgia Institute of Technology

**Deputy Director of Curriculum and Scheduling Services, Assistant Professor of Mathematics**
MAJ SAMUEL J. BOWDEN—BSEE, Oklahoma State University; MSIE, Ohio State University

**Assistant Chief, Data Management Division; Instructor in Computer Science**
MAJ DONALD E. BROWN—BS, Syracuse University; MS, Texas A&M University

**Chief, Scheduling Division; Instructor in Computer Science**
MAJ RICHARD A. SCHAAF—BS, Trinity College; MCS, Texas A&M University

**Academic Affairs Staff Officer; Executive Officer; Assistant Professor**
MAJ GEORGE H. WAYNE—BGS, University of Nebraska; MPA, University of Colorado; MA, EdD, University of Denver

**Chief, Data Management Division; Assistant Professor of Computer Science**
MAJ JAMES R. LEGG—BS, Colorado State University; MS, University of Illinois

*The faculty is fully committed to excellence in teaching and to motivation of cadets as their most important goals.*

**Academic Affairs Staff Officer**
CAPT MARILYN P. BUXTON—BA, Russell Sage College; MA, Central Michigan University

**Academic Affairs Staff Officer**
CAPT ROLLAND R. STONEMAN—BA, Upper Iowa University; MA, University of Northern Colorado

### CADET ACADEMIC ASSISTANCE PROGRAM

**Academic Program Managers**
2LT RICHARD L. ALVARADO—BS, U.S. Air Force Adademy
2LT GREGORY N. BLAKE—BS, U.S. Air Force Academy
2LT SAMUEL L. GILMORE, JR.—BS, U.S. Air Force Adademy
2LT RONALD S. HUNT—BS, U.S. Air Force Academy

### AUDIOVISUAL SERVICES

**Director, Audiovisual Services**
LT COL BRUFORD L. DOYLE—BA, MA, University of New Mexico; EdD, Oklahoma State University

**Deputy Director, Audiovisual Services**
EDWARD J. COLOSIMO—Graduate/Salwen School of Art and Design, Cleveland

### ACADEMY LIBRARIES

*The Academy Library contains the world-renowned Gimbel aeronautical history collection of some 20,000 items.*

**Tenure Director of Libraries and Associate Professor of Political Science**
LT COL BENJAMAN C. GLIDDEN—BS, U.S. Military Academy; MPA, Harvard University; PhD, University of Pittsburgh

**Assistant Director for Public Services**
DONALD J. BARRETT—BS, College of St. Thomas; MA, University of Minnesota

**Assistant Director for Technical Services and Instructor in English**
CAPT JAMES W. HOPKINS—BA, University of Texas at Arlington; MA, Midwestern State University

**Reference Librarian**
LOUIS C. BASSETTI—BA, St. Joseph's College; MA, University of Denver

**Chief, Cataloging Branch**
ELISABETH J. FLEENOR—BA, BLS, University of California, Berkeley

**Reference Librarian**
BETTY H. FOGLER—BA, University of Missouri; MA, University of Denver

**Chief, Acquisitions Branch**
BARBARA M. IVEY—BA, ML, Kansas State University

**Reference Librarian**
M. DOUGLAS JOHNSON—BA, New Mexico Institute of Mining and Technology; MLS, Brigham Young University

**Science Cataloger**
RITA A. JONES—BA, Western Maryland College; MA, University of Denver

**Reference Librarian**
FLORENCE F. KLEMM—BA, Harding College; MA, University of Denver

**Reference Branch**
ELIZABETH C. KYSELY—BA, Colorado College; MA, University of Denver

**Reference Librarians**
MARY ANN ROBINSON—BA, University of California, Santa Barbara; MA, MLS, University of Arizona
ROBERT S. SHAFFER—BA, University of California, Santa Barbara; MA, MLS, University of Arizona

**Cataloger**
AMES SMITH—BA, Westmar College; MSLS, Western Michigan University

## Department of Aeronautics

Col Daley

*The Aeronautics Department is noted for its outstanding laboratory in which cadets use wind tunnels and other modern equipment in their experiments.*

**Permanent Professor and Head of the Department**
COL DANIEL H. DALEY—BS, Purdue University; SM, Massachusetts Institute of Technology

**Tenure Professor**
LT COL WILLIAM A. EDGINGTON—BS, University of Cincinnati; MS, Air Force Institute of Technology; PhD, University of Oklahoma

**Tenure Associate Professors**
LT COL RICHARD F. FELTON—BS, West Virginia University; MS, PhD, Air Force Institute of Technology
LT COL ROGER W. GALLINGTON—BS, MS, PhD, University of Illinois

**Associate Professors**
LT COL FRED H. PORTER, III—BS, U.S. Air Force Academy; MSEE, Air Force Institute of Technology
MAJ ERIC J. JUMPER—BS, University of New Mexico; MS, University of Wyoming; PhD, Air Force Institute of Technology
MAJ RICHARD C. OLIVER—BS, U.S. Air Force Academy; MS, Air Force Institute of Technology; PhD, University of New Mexico
MAJ JOHN P. RETELLE, JR.—BS, U.S. Air Force Academy; MS, PhD, University of Colorado
CAPT HOWARD M. BRILLIANT—BSME, University of Pittsburgh; MSE, PhD, University of Michigan
CAPT MICHAEL M. TOWER—BS, MS, PhD, Texas A&M University

**Assistant Professors**
MAJ JOHN H. PLETCHER, JR.—BS, U.S. Air Force Academy; MS, Illinois Institute of Technology; PhD, Air Force Institute of Technology
MAJ JOHN A. WRIGHT—BS, U.S. Air Force Academy; MS, Air Force Institute of Technology
CAPT ROBERT H. BASKETT—BSME, Virginia Polytechnic Institute; MEME, University of Florida
CAPT JOHN H. BUXTON—BS, MS, Rensselaer Polytechnic Institute; MS, Ohio State University
CAPT KENT R. CRENSHAW—BS, U.S. Military Academy; MS, Air Force Institute of Technology
CAPT WILLIAM DIETERICH—BS, U.S. Air Force Academy; MBA, Wright State University; MS, Stanford University
CAPT ROGER D. HARTMAN—BS, U.S. Air Force Academy; MS, Air Force Institute of Technology
CAPT AUBIN M. HIGGINS—BS, MS, PhD, University of Kentucky
CAPT GLYNN E. SISSON—BS, U.S. Air Force Academy; MS, Air Force Institute of Technology

**Instructors**
MAJ EUGENE A. ROSE, III—BS, U.S. Air Force Academy; MS, Purdue University
MAJ THOMAS R. YECHOUT—BS, University of Minnesota; MS, University of Southern California
CAPT BRIAN A. BINN—BS, U.S. Air Force Academy; MS, U.S. Naval Postgraduate School
CAPT THOMAS R. BOLICK—BS, Georgia Institute of Technology; MS, University of Illinois
CAPT JOHN W. BUCHANAN—BS, U.S. Air Force Academy; MS, Stanford University
CAPT KENNETH E. GRIFFIN—BS, MS, University of Texas; PhD, Air Force Institute of Technology
CAPT TERRY A. HAMMOND—BS, U.S. Air Force Academy; MS, University of Florida
CAPT ROBERT L. HEATON—BS, U.S. Military Academy; MS, University of Southern California
CAPT LARRY A. HELGESON—BS, U.S. Air Force Academy; MS, Georgia Institute of Technology
CAPT PAUL I. KING—BS, Arizona State University; MS, Air Force Institute of Technology

CAPT DOUGLAS G. PICHA—BS, Oklahoma State University; MS, Air Force Institute of Technology
CAPT WILLIAM A. SEWARD—BS, Cornell University; MS, Air Force Institute of Technology
CAPT JOHN SHERFESEE—BS, MS, University of Arizona
CAPT PAUL D. THORNLEY—BS, MS, Utah State University
CAPT GERALD J. ZOLLARS—BS, MS, Pennsylvania State University; MBA, Georgia State University

*Lt Col Eller*

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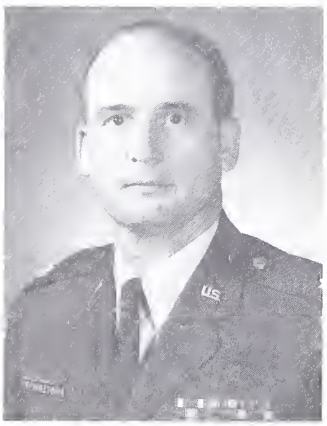

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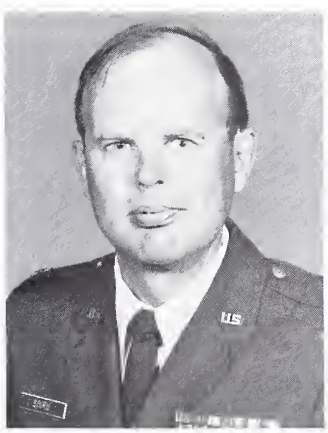

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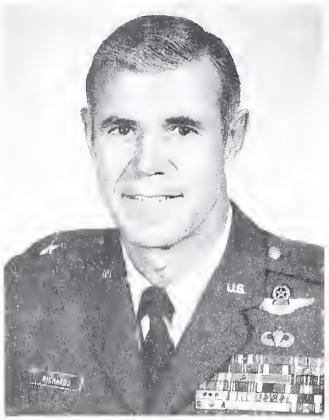

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SMSgt JOHN R. MONTEITH—AA, Community College of the Air Force, AA, Pikes Peak Community College; BA, Park College

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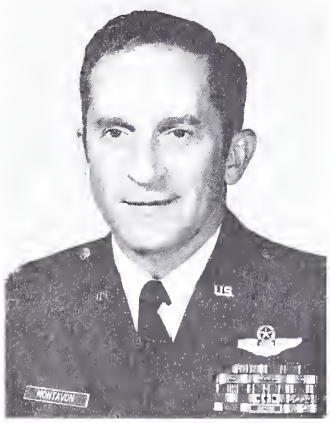
CAPT RONALD L. MORSE—BS, Southern Illinois University; MA, Louisiana Tech University



Col Montavon

## Deputy Commandant for the Cadet Wing

COL KENT MONTAVON—BS, U.S. Air Force Academy; MS, University of Arkansas
LT COL MAURICE A. HARRIS, Executive Officer—BS, North Carolina A&T State University; MA, Louisiana Tech University
CMSgt RONALD P. MILLER, Cadet Wing Sergeant Major

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LT COL ROBERT RHAME, Deputy AOC, Group 1—BS, U.S. Air Force Academy; MS, North Carolina State University; MS, St. Mary's University
MAJ KENNETH E. ROTH, Executive Officer—BA, MA, University of Missouri; MA, Webster College
MSgt WILLIAM ANDREWS, JR., Sergeant Major, Group 1
MAJ WILLIAM R. LAURIER, AOC, Squadron 1—BS, Mississippi State University; MS, University of Southern California
MAJ PHILLIP E. LITTS, AOC, Squadron 2—BS, University of California, Berkeley; MS, Abilene Christian University
MAJ GARY R. UNDERWOOD, AOC, Squadron 3—BA, Brigham Young University; MBA, Southern Illinois University
MAJ DENNIS P. McGUIRK, AOC, Squadron 4—BS, U.S. Air Force Academy; MPA, University of Colorado
MAJ MARVIN D. DUNLAP, AOC, Squadron 5—BS, Ft. Hays State College; MS, Webster College
MAJ EVERETTE A. HATCH, III, AOC, Squadron 6—BS, Virginia Military Institute; MS, Southern Illinois University
MAJ CURTIS McCARTY, AOC, Squadron 7—BS, Grambling State University; MS, Central Missouri State University
MAJ THOMAS S. BRANDON, AOC, Squadron 8—BS, U.S. Air Force Academy; MPA, Golden Gate University
MAJ LARRY C. BAGLEY, AOC, Squadron 9—BS, U.S. Air Force Academy; MS, Air Force Institute of Technology
CAPT ROBERT L. McKINNEY, AOC, Squadron 10—BS, U.S. Air Force Academy

### Group 2
LT COL LEE E. GOLDEN, AOC, Group 2—BA, University of Wyoming; MA, Saint Mary's University
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SMSgt RENE A. CANUEL, Sergeant Major, Group 2

MAJ VICKI B. ROBERTSON, AOC, Squadron 11—BS, MED, Pennsylvania State University
CAPT DOUGLAS M. COCKRUM, AOC, Squadron 12—BS, University of Colorado
MAJ ROBERT C. ESTUS, JR., AOC, Squadron 13—BS, U.S. Air Force Academy; MLA, Texas Christian University
MAJ GEORGE E. LONG, AOC, Squadron 14—BS, Campbell College; MS, Pepperdine University
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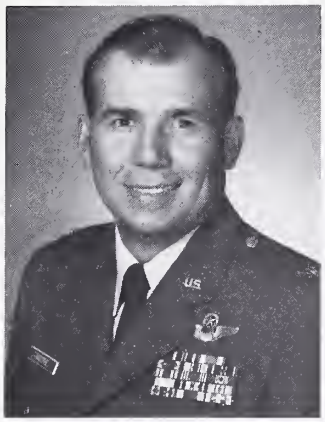

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DICK BUMPAS—BS, University of Arkansas
FISHER DeBERRY—BA, Wofford College; MEd, University of Pittsburgh
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FRED GOLDSMITH—BS, MEd, University of Florida
BOBBY TROTT—BS, University of North Carolina
MAJ ED HUTT—BS, University of California
MAJ DICK ENGA—BS, University of Minnesota; MS, Troy State University
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**Baseball Head Coach**
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**Pistol Head Coach**
SSgt LARRY G. HADLEY—BS, East Stroudsburg State College

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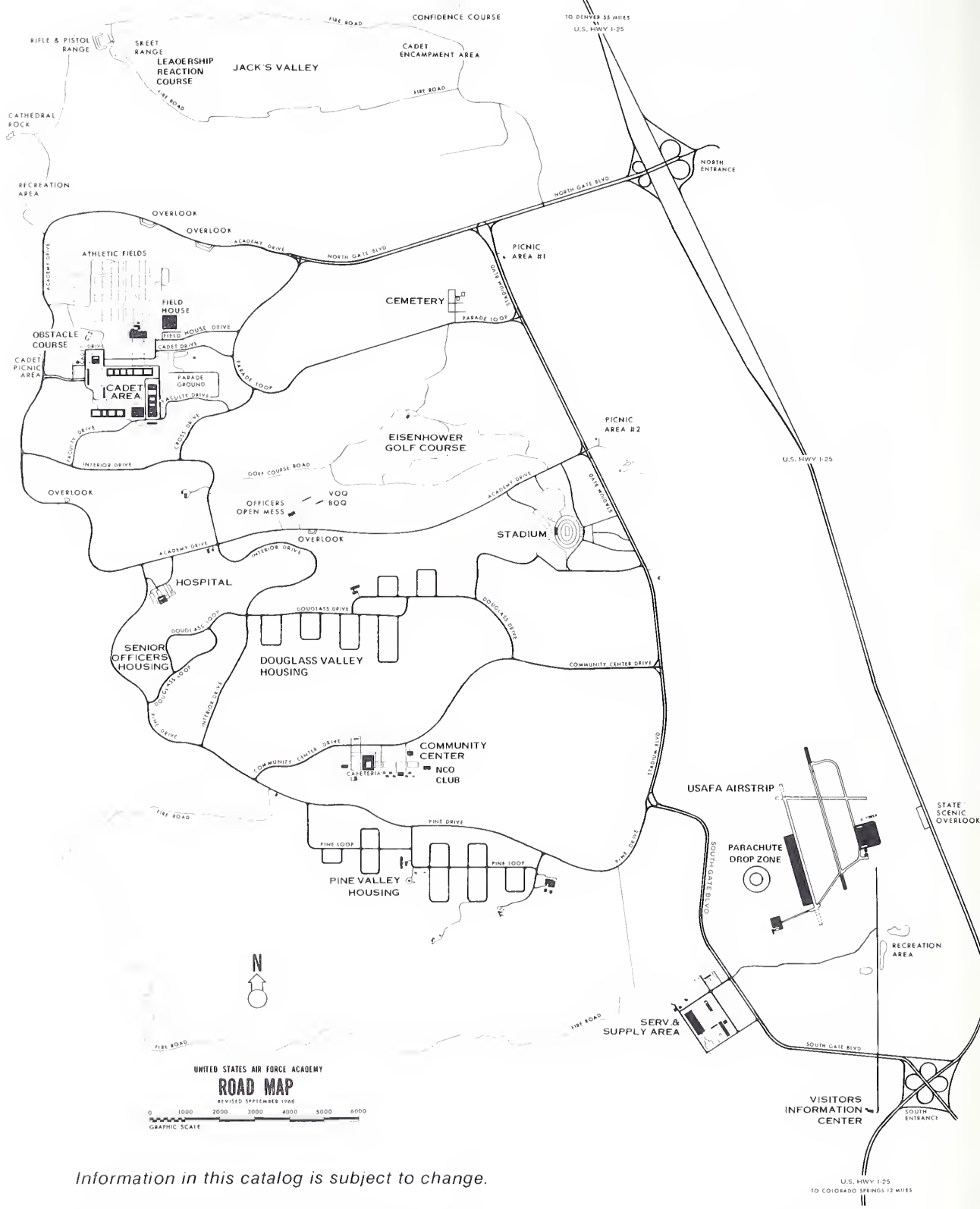


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